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A CONTRIBUTION TO THE DIAGNOSIS OF DIVERTICULA IN THE LOWER PART OF THE ŒSOPHAGUS.[1]

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The text-books tell us that œsophageal dilatations of a primary or idiopathic nature are extremely rare. Pressure diverticula usually are found in the upper third of the œsophagus. Traction diverticula are found in the lower third of the œsophagus, caused by adhesions of inflamed lymph glands. They are small and interest the pathologist only. This paper will not deal with them at all.

Late researches have shown that there is a third variety of diverticula in the lower part of the œsophagus of considerable size and importance. They are not produced by traction. It seems that they have usually been completely overlooked, because in an ordinary autopsy the lower part of the œsophagus is usually not examined.

The literature on the subject of idiopathic dilatation of the œsophagus comprises only 40 cases: Zenker and Ziemssen, 17; Kreuder, 3; Mermod, 1; Einhorn, 1; Leichtenstern, 1; Meltzer, 1; Rumpel, 3; Hölder, 1; Maybaum, 1; Jaffé, 1; Merkel, 1; Boas Netter, 1; Gussenbauer, 1; von Monakow, 1; Dreschfelder, 1; Kollat, 1; Chappet, 1; Westphalen, 1; Fleiner, 1; Kussmaul, 1. Five cases of true diverticulum of the lower œsophagus have been recorded: One case by Mintz, two cases by Reichmann, one case by Kelling, one case by Reitzenstein.

In only two of these cases had the authors an opportunity of proving their diagnosis by mechanical means.

[1] Read before the Medical Society of the District of Columbia, February 14, 1900.

Prcewosky is the only pathologist who found diverticula (not due to traction) in the lower part of the œsophagus. These diverticula, however, were not larger than a hazelnut. We cannot be too particular in making an accurate diagnosis of such rare conditions.

Reitzenstein, after investigating the cases of Strümpell and Klemperer, rejects them as not being true diverticula, and takes into consideration only the cases of Mintz, Reichmann, Kelling and his own. Mintz's case demonstrates distinctly the two different "swallowing sounds." His patient vomited matter of the previous day without bringing up the food eaten the same day. Mintz did not make Rumpel's test with the two tubes. Neither did Reichmann make use of his test. His first case was examined only superficially, and must, therefore, be considered as doubtful; his second case furnishes better proof. An œsophageal sound showed the passage into the stomach to be free after the diverticulum had been emptied of its contents. When pouring in water to the amount of 400 c.c. about 300 c.c. ran through into the stomach, while 100 c.c. remained in the diverticulum.

Kelling mentions that Mercier's œsophagus sound has been used and appreciated only by Leube. Kelling's case has been thoroughly examined and described. He arrived at his conclusions in a way different from Rumpel by making use of the second "swallowing sound." His résumé is as follows:

1. If the tube slips easily into the stomach, one can exclude ring-shaped, anatomical strictures.

2. If the tube does not penetrate at all into the stomach, the contents of the œsophagus are removed and a stiff tube is introduced. This is closed at the end and has one perforation at the side. Through this tube lukewarm water is poured in, and if by auscultation gurgling sounds at the cardia can be recognized, the attempt is made to push the tube further down. If, while the gurgling sound is audible at the cardia, the tube slips readily into the stomach the case is one of spasm. If, however, in spite of the running in of water the tube does not go further down the probability is that there is no spasm.

3. If the tube is arrested in the œsophagus and remains immovable in this position for a while, and then suddenly slips into the stomach, it proves the presence of spasm.

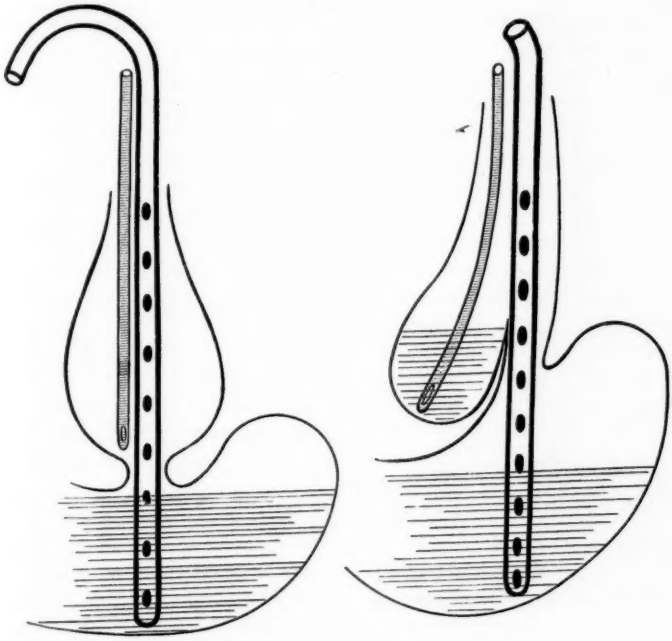
The presence of the swallowing sound is not an infallible test, however, for there are cases:

(*a*) Where the position of the œsophagus sound or its change from one position to another cannot be demonstrated.

(*b*) The second "swallowing sound" may be absent in diverticula, as Reitzenstein and Reichmann's second case have shown. On this point Kelling's method of diagnosis cannot be relied upon. The second swallowing sound is not usually present in cases of dilatation with spasm

of the cardia. In the forty-one cases reported the sound was either missing entirely or heard much later, or else was of a different character. It may also happen that the second sound immediately follows the first, as in Westphalen's case. Sometimes the two swallowing sounds can be heard at the back and not at all at the sternum. Again, only the first sound may be heard at the sternum, and not the second. Westphalen describes the sound which immediately follows the first gurgling sound as though a fluid were pouring into a pot partly filled with water. This was also the character of the sound recognized in my first case at the back, but not at the sternum.

FIG. 1.



Rumpel has recently made use of a most valuable test to show the difference between diverticulum and dilatation. He employs two tubes, one with numerous perforations in its lower third is passed directly into the stomach, the other into the œsophagus above the cardia (Fig. 1). Water, which is poured through the œsophagus tube, will run down into the stomach through the perforated tube in case of a dilatation. In the event of a diverticulum this will first be filled, and only the overflow will run into the stomach. The contents of the diverticulum can be

returned through the œsophagus tube and accurately measured. The main condition of this test is that the perforated tube really enters the stomach. This, however, is often accomplished only with the greatest difficulty. In cases of large dilatation one rarely succeeds in finding the cardiac opening. The patient often believes the tube to be in the stomach when it is not; in the beginning of the disease the patient is able to locate the tube correctly, but as the disease advances the feeling of resistance is wanting, and a chemical analysis alone can furnish proof positive whether the tube was in the stomach or bent upon itself within a dilatation which may have a capacity varying between 400 and 1000 c.c. Rumpel's experiments cannot furnish the proof that the tube has entered the stomach, as no gastric juice can be obtained, the perforations in the tube preventing the return flow. One might pour in large quantities of water, thereby proving that the stomach has been reached. If medium quantities of water not showing any reaction of gastric juice can be returned through the œsophagus tube it would indicate that the tube had not passed beyond the cardia. Since, however, the capacity of the stomach varies according to Ewald between 250 to 1680 c.c., and Netter's as well as Hölder's cases show even œsophageal dilatations of over 1000 c.c., it follows that no accurate conclusion can be drawn from the amount of fluid introduced. If found that one and a half litre can be poured in without any return flow from the second or œsophagus tube, the fact must be accepted that the first lower tube has entered the stomach. The perforation of the tube makes it impossible for the water to return. If now one pours more water through tube No. 2 it will not run into the stomach, which is already full, even if we had to deal with an œsophageal dilatation. This might produce the erroneous idea of a diverticulum. In other words, when the proof has been given that the tube is in the stomach it becomes impossible to make use of Rumpel's diagnostic test.

Reitzenstein appreciated this difficulty and tried to prove the presence of the tube in the stomach by palpation or inflation of the stomach. With a perforated tube inflation is an impossibility. Palpation is not always possible, as Boas has shown. In order to prove stagnation about the cardia it is absolutely necessary to show the differential analysis between the contents of the stomach and œsophagus.

My endeavor was to use the perforated tube test and at the same time examine gastric juice for HCl and ferments, proving thereby that the tube was doubtless in the stomach. I therefore made the following experiment: An ordinary stomach tube with about ten small holes distributed over a length of 30 cm. was introduced. Into this tube I put a smaller one, which had only two holes at the end. This double tube is capable of giving a double proof. (The inner tube can be very thin, if one is satisfied with one test alone.)

1. If one introduces the double tube into the stomach one can readily aspirate gastric juice through the inner tube. (Should this tube be very thin the gastric contents can be diluted by pouring in a definite small quantity of water.)

2. The stomach can be filled and emptied at will.

This water test can now be made without in the least interfering with the rest of the experiment. With Rumpel's perforated tube a return

FIG. 2.

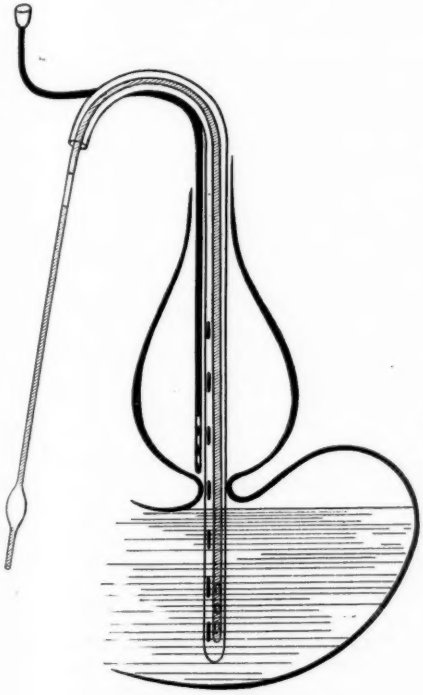
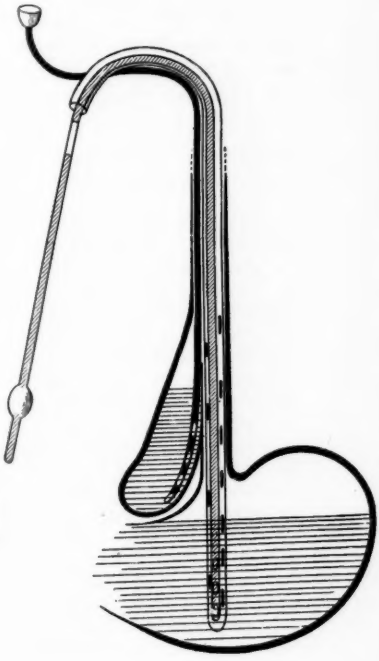


FIG. 3.



flow of water cannot take place. If water is now poured through the œsophagus tube:

a. In case of dilatation the water will run through the perforation of tube No. 1 into the stomach, the inner tube being no obstacle. Besides this, the inner tube can be removed after having accomplished its purpose of aspirating gastric juice (Fig. 2).

b. In case of a diverticulum a certain amount of water will remain in the pouch, and can be returned through the œsophagus tube (Fig. 3).

The inner tube may be made of soft metal, thereby giving a certain amount of stiffness to the outer tube. One could also give it the bend of Mercier's sound. This latter would be necessary to satisfy Kelling's demands. My own experiments were made by means of a rather stiff stomach tube and an inner tube 65 cm. long, on the order of a ureteral catheter. This inner tube has sufficient firmness to be pushed in and out as necessity arises. The patient swallows the perforated stomach tube, and I afterward introduce the inner tube. If the entrance to the stomach is difficult to find, the double tube, with the inner tube of soft metal, to which is given the curve of Mercier's sound, is introduced. If by this method of experimentation it has been proved that the perforated tube is in the stomach, no water ought to return from it, at least not before the stomach is filled to overflowing.

Reitzenstein does not lay sufficient stress upon this fact.

I found that every time when water could be returned through the perforated tube this latter was not in the stomach, but bent upon itself in the œsophagus.

CASE I.—On June 22, 1897, a man came to my office in a state of exhaustion. It was believed that he had a cancer of the stomach. He had lost twenty pounds during the last few months. He could not eat, and could swallow only with the greatest difficulty. Food could not be retained. Besides, he was subject to the most painful cramps in the pit of the stomach, for which physicians had resorted to morphine. He was determined not to continue this drug on account of its unpleasant effects. As the patient complained of difficulty of swallowing for four years, and had been subject to cramps previous to that time, the diagnosis of carcinoma was questioned.

W. W. P., captain of police, is sixty-four years of age. His father died of old age at eighty-four years. Mother died of typhoid fever. No hereditary taint. Patient had in his youth suffered from typhoid, variola, spotted fever, and malaria. He developed, however, into a strong, robust man. He admits that he eats hastily, and his daughter relates that he gulps down whole tumblerfuls of ice water at a time. In his younger days he used to smoke from fifteen to twenty cigars a day. When about forty years of age he commenced to suffer from fulness after eating. Soon after this cramps developed, which reached an intense degree. Patient describes these in the following manner: When least expected he suddenly experiences a slight pressure in the pit of the stomach. He knows at once what this signifies, drives home as quickly as possible, and goes to bed. The pain intensifies so rapidly that the patient has to press hard with both hands on his stomach in order to get some relief. At the height of the attack he is not able to breathe, and almost chokes. By degrees the contraction subsides, and he is able to breathe again with peculiar sighing sounds. The pain seems to cut off the respiration, as he expresses it. Physicians have given him injections of morphine, and the patient chloroforms himself. Every imaginable diagnosis had been made: spasm of the finest bronchioles, asthma, liver colic, gallstones. During all these years the patient had dyspepsia, but did not vomit. About six years ago he commenced to raise food,

and at the same time the fulness after eating diminished. At first the vomiting seemed to ease his pain, but later it remained the same. The vomited matter was often mixed with mucus. Patient was not able to tell whether the ejected food came from the œsophagus or from the stomach. He always called it " vomiting." After two more years of this condition the patient became almost unable to swallow. He could help himself, however, by taking water between each mouthful. Later this always failed. Patient often ejected his whole meal over the table in the midst of such a swallow. He commenced to eat alone, and became melancholic and despaired of medical aid, as the " physicians prescribed remedies for him, but no one could teach him how to get them into the stomach." Patient lost flesh rapidly. Only during a short time he got a little relief while a physician had attempted to pump him out; but this was soon abandoned. Shortly before the patient came to me he had been through one of his fearful attacks of cramps. When he had diarrhœa he always knew that an attack was coming on. Whenever he felt it approaching he had an irresistible desire to lie down. Again, he was much troubled at night by coughing, and had to vomit mucus before he could find rest. The only position in which he could sleep was with his thorax raised. Sometimes he is better able to swallow by putting his head as far back as possible. He feels that the food meets with resistance before passing into the stomach. At such times, then, there cannot be spasm of the cardia, but another obstacle higher up (as found later this obstacle was the entrance of the diverticulum).

Status. Height, five feet eleven and one-half inches; man with large frame, faded skin, heart sounds normal, pulsus tardus, but alike at both wrists; no pronounced arterio-sclerosis; patellar reflexes not increased; no dulness along the spinal column.

Upon introduction of the stomach tube about 300 c.c. of stagnating food came out. At a distance of 41 cm. from the teeth the tube met with a resistance. After repeated attempts with large tubes the stomach was finally reached. This was proved by the analysis of the matter brought up. The fact that the largest sounds passed the obstacle easier than the thin ones, together with the long duration of the disease, decidedly excluded carcinoma.

The stomach splashed as low as two fingers below the navel. Liver was not enlarged. Urine contained neither albumin nor sugar. The material withdrawn from the œsophagus was usually of a sweetish odor, in three layers, and mixed with much mucus. All subsequent examinations showed the same characteristics and large quantities of food of the previous day. Spinach was especially easily recognized, and had sometimes been eaten two days before. I succeeded in putting a Boas test-meal into the stomach through the tube. After an hour it was removed, and showed the following analysis:

Total acidity, 30; free HCl, 0.036 per cent.; congo, phloroglucin vanillin. Tropæolin gave a positive result; pepton and propepton present; rennet ferment present; rennet zymogen; milk coagulates until a dilution of 1 : 80 is reached. Sugar test weakly positive; starch and achroodextrin present; lactic acid present in small quantity.

The analysis of the contents of the œsophagus on the same day showed the following:

Total acidity, 11; congo test, weakly positive; phloroglucin vanil-

lin; tropæolin reaction absent; no biuret reaction; no rennet ferment; no rennet zymogen; sugar reaction strongly positive; lactic acid strongly positive.

The opening into the stomach frequently could not be found. Besides, the patient could not bear much manipulating because of great pain. When I tried to pass thick elastic tubes, in order to let them remain for some time, I had to give it up on account of supervening cramps. At other times the patient suddenly felt the tube slip as if into the stomach. It conveyed the same sensation to my fingers. Usually, however, I could not pour water through the tube, or, if so, very little. Matter brought up showed no HCl or ferments. The tube simply had bent into a curve and remained in the space above the stomach. If the tube really was in the stomach it became an easy matter to pour water in and out. If a weak solution of eosin was put into the stomach and a solution of methyl-blue through a second tube into the œsophagus, both solutions could be returned with their original color. The amount of food in the œsophagus in the morning varied between 210 to 300 c.c. The microscopical examination of the œsophagus contents showed:

Vegetable cells, fat globules, starch granules, yeast in large quantity, bacilli; a very active variety of coccus.

In order to make an accurate diagnosis between dilatation and diverticulum or dilatation with diverticulum, I made my test with the inner and the œsophageal tubes, as described above. After the œsophagus was emptied of its contents I tested the presence of tube No. 1 in the stomach. The inner tube was very readily passed in and out for this purpose. The contents of the stomach, as brought up through this inner tube, showed the following analysis (three different experiments): Total acidity, 80, 100, 150; free HCl, 0.18, 0.14, 0.328; congo, phloroglucin vanillin, tropæolin strongly positive; ferments positive.

The contents of the œsophagus during the same experiments showed the following reaction: Total acidity, 26, 21, 20; free HCl, none; no ferments; sugar test positive; lactic acid reaction strongly positive.

Whenever 400 to 500 c.c. of water had been poured in about 180 to 225 c.c. could be returned through the œsophageal tube introduced to a distance of 45 cm. The rest of the water could be returned through the inner tube from the stomach. The degree of acidity of these two fluids was always very different. Both were acid, but the œsophagus water reacted feebly upon congo, while the stomach water showed a marked reaction. If the œsophagus was filled to the limit it could hold 500 c.c. About 200 c.c. of this, as shown above, were contained in the diverticulum. The gastrodiaphane showed an illuminated zone at the processus ensiformis sterni, which did not correspond to the level of the stomach (Fig. 4, A). This transparent zone was situated above the upper border of the stomach, which could be distinctly demonstrated by inflation. The electric light could be pushed below this point and to the left at other times, transilluminating the stomach proper (Fig. 4, B). The examination by means of the X-rays did not give very satisfactory results as far as details are concerned. Yet a very useful point was determined. The accompanying sketch (Fig. 5) gives a posterior view, the broadening of the shadow corresponding to the spinal column is caused by the dilatation of the œsophagus. The dis-

tinct bulging to the right shows the location of the diverticulum. I had filled the œsophagus with a bismuth solution and also made the

FIG. 4.

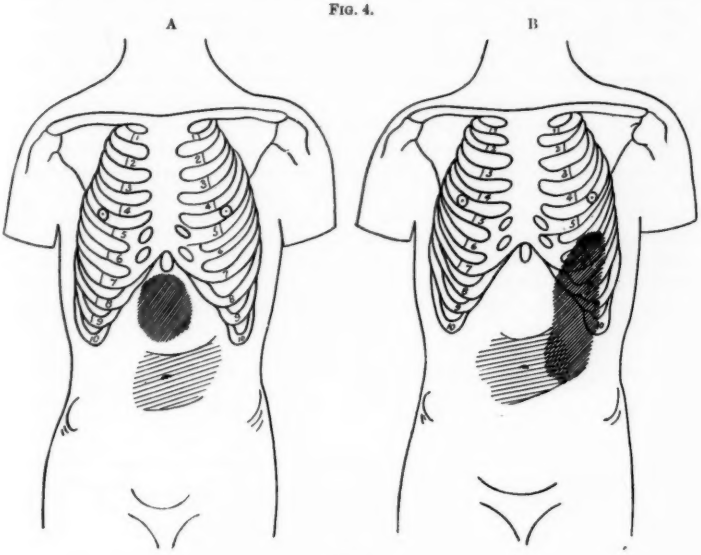
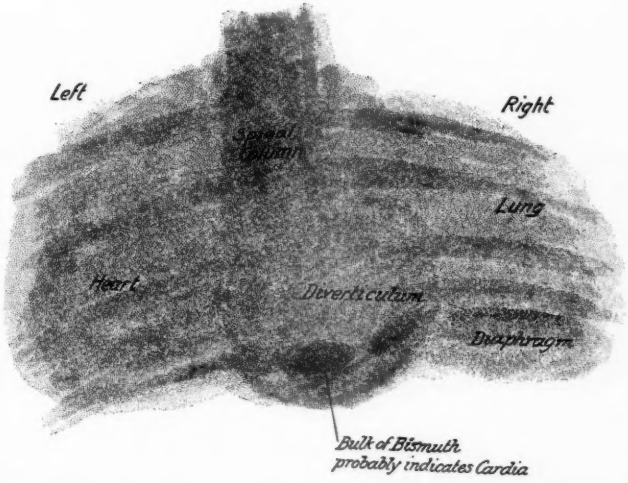


FIG. 5.

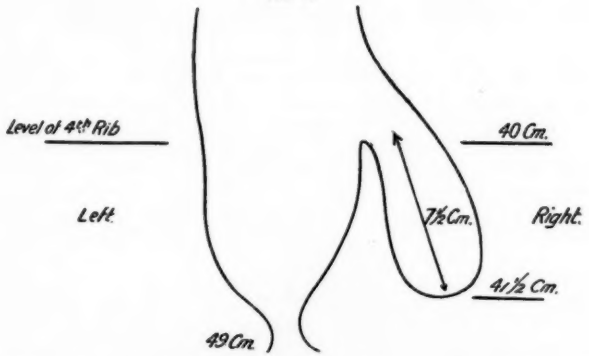


patient swallow some bismuth tablets. Besides this I had introduced a lead sound. The latter is scarcely visible in the picture. The bis-

muth tablets show most distinctly as the darkest spot on the positive. It was interesting to notice the motion of the diaphragm before we exposed fifteen minutes. These excursions extended over 5 cm. By subtracting these from the height of the diverticulum, thus correcting the enlargement of the shadow caused by the respiration, we obtained 7½ cm. as the actual height of the diverticulum. The skiagram shows distinctly that the diverticulum was situated above the diaphragm.

The oscillations in the manometer test were inverse in the stomach to those in the œsophagus. This also proved the diverticulum to be above the diaphragm. The opening of the diverticulum could not be found by means of the test used by Kelling. I could hear only the first swallowing sound at the sternum. The second sound never could be heard in all my experiments. Immediately following the first sound at the sternum there could be heard a second at the back, such as Westphalen has described.[1] It sounded as though liquid fell into a pot which already contained liquid. This sound was not always audible. If the diverticulum was filled with 200 c.c. of a solution of methyl-blue the outside

FIG. 6.



white part of a double tube showed the blue discoloration at a height of 7½ cm. This test corresponds exactly with the measurements of the diverticulum on the photographic plate. Whenever an entrance into the stomach or diverticulum was forced the patient complained of a scratching pain at a distance of 40 cm. from the teeth. A stiff tube could be passed into the diverticulum to a depth of 47 cm. The cardia was at a height of 49 cm.

When the diverticulum was filled with 200 c.c. of water and a connection made with the outside in the manner of communicating tubes, the entrance of the diverticulum was indicated by the level of the fluid at the height of the fourth rib. The above picture was obtained (Fig 6).

The subjective feelings of the patient corresponded exactly to these measurements. At X the first resistance was met, and only at X the two separate openings had to be forced. This obstacle once passed, a soft tube could bend itself as well in the œsophagus above the cardia

[1] Westphalen: Archiv für Verdauungs Krankheiten, Band v., Heft 1.

as in the diverticulum. In both events it was an easy matter to introduce 50, 60, or 65 cm. of tube. Often one imagined being in the stomach until the inner tube proved the fallacy of the supposition. After the X-ray had demonstrated that the diverticulum was to the right it was an easier matter to reach the stomach than before, by observing the following rules: Starting at the right corner of the mouth I directed the tube to the left, to a distance of 39½ cm. from the teeth. Now the inner tube was passed through the perforated one, the lower end having previously been bent after the pattern of Mercier's sound. Into the inner tube I had put a thick copper wire in order to preserve the angle. Sometimes I introduced at once the perforated tube, holding the inner tube and wire. By this method I was enabled to reach the stomach with ease by keeping to the left after 40 cm. of the tube had been swallowed. The cardia resisted comparatively little. The œsophageal tube was always directed to the right. I also made the following experiment: With all three tubes *in situ* I poured water through the inner of the double tubes into the stomach, and 200 c.c. of colored liquid was poured through the œsophageal tube into the diverticulum. After waiting a while both tubes were lowered, and the œsophageal tube emptied the diverticulum of its colored contents, while the stomach tube returned clear water without a trace of color.

Since the patient has learned what is the matter with him he says that he vomits from both the stomach and the œsophagus. The vomiting of the œsophagus is done with ease and without nausea, whereas the stomach emesis occurs only after great straining and nausea. The patient thus wishes to correct his former statements, wherein he called everything ejected from the mouth vomiting.

I have carefully observed the patient for over two years, and yet clearness on certain points was obtained only be degrees.

Lavage of the œsophagus made the patient quite comfortable. His weight has steadily increased, and he is stronger and better than for years. He is perfectly able to perform his duties as a policeman. He no longer suffers from cramps. The diverticulum is never empty, yet the difficulty of swallowing is considerably diminished. He feels best of all on a semi-fluid diet. Milk-toast is a favorite dish with him, and of sugar he cannot get enough. His weight is 168 pounds. The spasms were cut short by the administration of small Seidlitz powders, which saved him from morphine, chloroform, and cramps. As these powders also play a part in my second case, I shall refer to them again.

Case II.—On March 8, 1898, a patient consulted me and stated that she is often obliged to leave the table either on account of violent cramps or vomiting. A physician had treated her by daily lavage without giving any relief. I requested her to write down her case-history, drawing her attention to the most important points.

Twenty years ago Mrs. S. had malarial fever. When she had sufficiently recovered to be about again she commenced to suffer from violent cramps in the region of the stomach. In the middle of the night she was often surprised by an attack. The more physicians she consulted the more names were given to her trouble. In the course of time she commenced to vomit without experiencing any nausea. The food simply came up and was expectorated. Patient also suffered from waterbrash. At all times and in the most uncontrollable fashion she would

bring up large quantities of slimy water. At night this fluid often came even through the nose if her head was low. Twelve years ago she began to experience difficulty in swallowing. The attending physicians were unable to recognize the nature of the trouble, and her family despaired of her recovery. She lived on rice and cream, but the attacks did not diminish. Her symptoms had come one by one in the course of years. First painful stomach cramps, then vomiting without nausea, and, lastly, difficulty of swallowing. Patient is able to state very accurately whether food reaches the stomach or not. The pressure in the latter case is very painful, especially over the left side under the breast. The heart beats with a violence almost unbearable, and her arms and hands are cold as ice. Mrs. S. is obliged to walk up and down with her arms raised above her head and holding her breath. Suddenly the inside resistance seems to yield, she feels the food rush down, and the attack is over. Patient can now return to the table and eat, although usually too exhausted to do so. Cold beverages are her worst enemies. A tumblerful of ice water at meal-time invariably brings on an attack, which Mrs. S., like the first patient, compares to choking. Between meals the patient is able to drink, yet has to be very careful. Mrs. S. is absolutely sure that often the ejected food is a day old, sometimes even two days. She also noticed that it is not at all mixed with the last eaten food. She very rarely vomits from the stomach. At night she is troubled with coughing and prevented from sleeping. She cannot lie down flat. Carbonic acid gas in any form gives her the greatest relief. Sometimes the drinking of large quantities of water produce vomiting, and thereby relief. Patient is of a nervous temperament. She considers the severe malarial fever of her youth the cause of her trouble. Of course, she did not suspect the real nature of her disease.

Status. Small size; weight, 130 pounds. Mild anæmia. Patellar reflexes somewhat exaggerated, no hyperæsthesia, delicate constitution. Heart normal, pulse 72, goes to 85 as soon as patient is excited. It is an easy matter to raise up 100 c.c. slimy food remnants from the œsophagus. At the level of the cardia one meets with an obstruction which cannot always be overcome. At times one succeeds in getting into the stomach, as shown by subsequent analysis. The contents of the œsophagus never showed free HCl or ferments, while lactic acid and sugar were always plentiful. With much difficulty I succeeded in getting a test-meal into the stomach proper. The analysis after an hour was as follows: Total acidity, 40; free HCl, 0.07 per cent.; starch, achroodextrin; lactic acid, weak; ferments, positive.

A diagnosis of cardio-spasm with dilatation of the œsophagus was made. As soon as the tube reached the cardia a most painful spasm occurred. Elastic solid sounds could not be used at all. Sometimes the use of the tube had to be abandoned, because a cramp would occur as soon as the lower end of the œsophagus was reached. Quite accidentally we found that it was not always necessary to resort to morphine or chloroform to overcome the painful spasm, as a small Seidlitz powder would do the same, and the effervescing bromo-water proved especially effectual. The carbonic acid gas seems to have a decided effect upon the innervation of the muscle, as is also the case in atony of the stomach. Very small quantities were sufficient to secure prompt relief. In severe cases I give first a solution of sodium bicarbonate, and follow it by one of acid tartar. My first case was thereby entirely relieved from the

necessity for narcotics, and Mrs. S. writes me that the cramps are very rare under the use of an effervescing bromo-water as a table water.

Internal faradization with Einhorn's electrode benefited the patient very much. To my regret she had to go West, and I was unable to follow up the case personally except by correspondence. I hope in a few weeks, when she returns to town, to make my experiment with the perforated double tube, thereby making a correct diagnosis.

The second swallowing sound was not audible in this case.

All her symptoms point to spasm of the cardia with dilatation of the œsophagus. Only one symptom argues against this—a symptom thought of much importance by Mintz. Patient vomits food taken on previous days, while food of the same day seems to remain down. One might think that in a pouchy dilatation without diverticulum this might be possible. Certainty will only be obtained by making the double-tube test.

This article was written more than a month ago, and the patient in question has returned in the meantime. Examinations were resumed. They are extremely difficult on account of the cramps of the cardia. The average result of frequent soundings with the three tubes was that about 120 c.c. usually remained above the cardia and could be removed again through the œsophageal tube, thus proving the presence of a diverticulum. The test with colored fluids proved the same.

Kelling's test was tried with negative results. When water was poured through a stiff tube with only one lateral hole near the end the gurgling sound produced by the running of the water from the tube was heard, but never a real second swallowing sound. I made the further observation that it was sometimes possible to introduce the tube into the stomach after a small Seidlitz powder had relaxed the spasm. Since this was a case of subacidity it was very often not the presence of free HCl which proved the main tube to be in the stomach. As the examinations were frequently made without test-meals and preferably with an empty stomach, the total acidity of the œsophagus was sometimes higher than that of the stomach proper; for instance, 25 stomach, 32 diverticulum.

Nevertheless, the differential diagnosis proved that both tubes were lying in different cavities. The amount of lactic acid and of sugar was always higher in the œsophagus than in the stomach. After test-meals of course the most accurate differential analysis could be made.

The vomiting of masses two days old was explained by the presence of a diverticulum. It seems to be very safe to rely upon this symptom in cases where examinations are not possible.

Both my cases were again examined with the diaphane, and I succeeded in both in transilluminating a zone corresponding to the position of the stomach proper.

The exclusion of ring-shaped organic strictures on the base of scars, carcinoma, etc., is easily made, as Netter, Rumpell, Kelling and others

have shown. In the differential diagnosis of diverticula it will be well to consider the following points:

1. With dilatation as well as with diverticula there occur painful cardio-spasms (Kelly, Jung) as well as painless cases (Reitzenstein).

2. In both vomiting occurs from the œsophagus, occasionally from the stomach. Even in cases of typical cardio-spasm eructation from the stomach may occur.

3. If food is vomited, eaten one or two days before, while other food eaten in the meantime remains down, the case seems to be one of diverticulum. No observations to the contrary have been made so far.

4. The swallowing sounds are abnormal in all cases of dilatation. In cases of diverticula the swallowing sounds are audible in 33 per cent., and can be used for diagnostic purposes (Kelling's method). Westphalen's sound can also be heard in diverticulum with dilatation of the œsophagus (Jung).

5. If after emptying the œsophagus it is easy to enter the stomach a diverticulum probably exists (Mintz, Reichmann). Yet the passage of the tube may be difficult. "Only once out of ten experiments does one find the cardia and gain entrance into the stomach" (Reitzenstein).

6. In making Rumpell's test, proof must be furnished that the tube is actually in the stomach. Inflation in this case is impossible, as feeling of the sound is not always practicable.

7. The proof positive of having entered the stomach is obtaining gastric juice through the inner tube (Jung).

8. Mercier's sound or Leube's diverticulum tube are necessary in order to find the entrance into the stomach. These tubes must be perforated for the diverticulum test, and by means of a thin inner tube gastric juice can be brought up.

9. After a diverticulum has been diagnosed its height can be ascertained (*a*) by Kelling's test (swallowing sounds) and (*b*) by filling the diverticulum with a colored solution and putting a narrow strip of white adhesive plaster longitudinally on the tube.

10. Neubauer's experiment for ascertaining the level of the liquid can also be used according to Kelling to determine the entrance into the diverticulum.

11. The entrance of the diverticulum can easily be overlooked by œsophagoscopy.

12. Gastrodiaphany did not show the diverticulum in Mintz's case, and gave no information about the kind of enlargement. In Reitzenstein's case it was possible to make the diagnosis diverticulum by gastrodiaphany alone.

13. X-rays show an enlargement of the œsophagus only.

14. The statements of even the most experienced patient, that the tube is in the stomach, are often erroneous. The bending of the tube

gives the patient and physician alike a sensation as though the tube had entered the stomach.

REFERENCES.

Netter: Archiv für Verdauungs Krankheiten, 1898, Band iv., Heft 2.
Reitzenstein: Münch. med. Wochenschrift, 1898, No. 12.
Westphalen: Archiv für Verdauungs Krankheiten, 1899, Band v., Heft 1.

THE CLINICAL ASPECT OF PLAGUE.

WITH ILLUSTRATIVE CASES.

By Frank G. Clemow, M.D. Edin., D.P.H. Camb.

I.

It can scarcely be claimed that the last word has yet been said upon the terribly fatal disease which has caused such ravages in India and elsewhere during the past few years. Little apology is therefore needed for any further contribution which may tend to throw light upon the nature of the malady, and I gladly comply with the request of one of the editors of this Journal to communicate an article upon the subject.

The following notes are an attempt to put upon record the clinical facts of plague as they have been observed by myself in a large number of cases. They do not lay claim to be in any sense a full and complete description of the disease. Considerations of space alone would have prevented the undertaking of so great a task. They are confined entirely to the clinical aspect of plague. The etiology, bacteriology, mode of spread, pathology, prognosis and treatment of the disease, if alluded to at all, are mentioned only incidentally and as briefly as possible, and where it seemed necessary to refer to them in illustration of the clinical appearances.

The general character of plague and the principal symptoms and signs which usually characterize an attack of the disease have been so repeatedly described that it appears unnecessary to give any preliminary account of them before commencing a discussion in some detail of the clinical phenomena of the disease.[1]

Four principal varieties of plague have been recognized, depending upon the channel by which the bacillus associated with the disease enters the tissues of the patient, and the clinical features in each instance are

[1] The present paper will be based principally upon the clinical notes of 502 cases of plague admitted to the Parel Old Government House Hospital, Bombay, during the nearly three months the author was in charge of it, in addition to notes of 152 cases already in the wards at the commencement of that period, and of a large number of cases seen in the hospitals and in district work in Calcutta.

to a great extent modified by this primary factor in the production of the disease. The four varieties are the following:

1. *The bubonic variety of plague*, in which the bacillus appears to enter the body through some abrasion or discontinuity in the skin, and passes at once to the nearest lymphatic gland or glands, where it proceeds to multiply, causing in consequence inflammatory swelling of the gland or glands involved.

2. *The pneumonic variety of plague*, in which the bacillus gains primary access to the lungs and produces a specific affection of these organs, of the nature of a lobular pneumonia.

3. *The septicæmic variety of plague*, in which the bacillus probably enters the system in the same manner as in the bubonic variety, but, instead of remaining for a time in a lymphatic gland and producing a bubo, appears to pass almost at once into the general lymph stream and to affect a very large number of glands throughout the entire body. As the word septicæmia implies, the bacillus in these cases probably gains access to the blood-stream very rapidly—more rapidly than in the bubonic variety of the disease. Fatal cases of the latter and of the pneumonic variety very frequently, if not always, become septicæmic before death; that is to say, the bacilli escape from the gland in one case and the lung in the other and enter the general blood-stream. The term septicæmic, as applied to the cases included in the group under discussion, is, perhaps, a not altogether satisfactory one, for there is good reason to believe that the bacillus never grows primarily in the blood-stream; it appears to require a preliminary stage of growth, either in the lungs or in some part of the lymphatic system—whether in one or many glands—where it can produce a sufficient quantity of toxins to overcome the protective forces possessed by the blood against an invasion of bacilli. This is a pathological question which it would be out of place to discuss more fully in the present paper, where it is intended to deal only with the clinical manifestations of the disease.

4. *The abdominal, or enteric, variety of plague.* A group of cases have been described in which the symptoms of gastro-intestinal affection are unusually marked, and in which it has been thought that the bacillus has entered the body by means of the gastro-intestinal tract, either in food or in drinking-water. It will be shown, in discussing the phenomena of plague in connection with the alimentary system, that abdominal symptoms are in some cases unusually prominent, but the proof that these cases are produced in the way described is wanting, and, for the present, it must remain an open question whether this mode of infection does occur in the human body.

Of these four varieties of plague the bubonic is, in most epidemic outbreaks, by far the commonest, cases of this kind contributing from 80 to 90 per cent. of the total cases. It is to this variety of the disease

that the following notes in the main refer, incidental reference only being made to the other varieties mentioned. In these notes, I should wish to add, only the clinical features proper to an attack of plague are dealt with; considerations of space alone prevented a discussion of the innumerable complications and sequelæ which are so commonly associated with the disease.

THE TEMPERATURE. The temperature-chart in a case of plague shows no such characteristic curve as is commonly met with in many other febrile diseases, such, for example, as relapsing fever or ague. The rise from the normal is probably more or less rapid, but in hospital practice in India it is rare to see a plague patient during the period of onset, and most usually at the time of admission to hospital the fever has already attained a considerable height. More often than not the temperature is over 103° on admission, and temperatures of 104°, 105° and even higher are not very uncommon. In perhaps the majority of cases the temperature rises at some period in the course of the attack to over 104°. In some cases it may rise before death to 106°, 107° or 108°. These high temperatures are usually met with immediately before death; but this is not invariably the case, and death may be preceded by a marked fall of temperature even down to or below normal.

The following figures may help to throw some light upon the relation of the height of the temperature to the severity of the attack. They show the percentage mortality in cases grouped according to the highest point attained by the temperature at any period of the illness. In the first two groups, it should be noted, the thermometer rose to 104° or 105° on more than one occasion in some of the patients. In the last three groups the temperatures of 106°, 107° and 108°, respectively, were reached on one occasion only in every case.

TABLE I.

Highest temperature at any period of attack.	Number of cases.	Died.	Percentage mortality.
Between 104° and 105°	217	187	86.18
" 105 " 106	68	57	83.8
" 106 " 107	13	12	92
" 107 " 108	1	1	100
109°	1	1	100
Total above 104°	300	258	86

The percentage mortality among the 300 patients in whom the temperature rose above 104° was 86. On the other hand, in 202 patients under treatment at the same time and under exactly the same circum-

stances, but in whom the temperature did not at any time rise as high as 104°, the mortality was only 73.7 per cent. It would seem, therefore, that a rise of temperature to above 104° F. is a distinctly unfavorable sign. It is somewhat remarkable that the mortality in the second group (patients whose temperature rose to between 105° and 106°) was somewhat lower than that in the first group (patients whose highest temperature was between 104° and 105°). The safest conclusion to draw from these figures—and it is one supported by general impressions—would appear to be that while a temperature of 104° or over is an unfavorable prognostic sign, a rise to 105° is not more unfavorable than a rise to 104°, but that above this point each further rise of temperature implies a more severe attack of the disease and a graver prognosis.

Of 15 cases in which the temperature rose above 106°, only 1, it will be observed recovered, while of the two patients in whom the temperature rose above 107° and 108° respectively both died. The following are brief notes of three of the cases just referred to:

CASE I. (Register No. 757. Recovery after a rise of temperature to 105°.)—Male, Hindoo, aged eighteen years. Left axillary bubo. Vomiting and delirium troublesome. Secondary pneumonia, and rise of temperature to 106°. Admitted on fourth day of the disease, and discharged, cured, thirty-five days later.

CASE II. (Register No. 981. Death after rise of temperature to 107.8°.)—Hindoo, female, aged fifteen years. Right axillary bubo. Much delirium. Some bronchitis. Admitted the seventh day of the disease, and died eighteen hours after admission. Temperature just before death, 107.8°.

CASE III. (Register No. 951. Death after rise of temperature to 108°.)—Hindoo, female, aged eighteen years. Left axillary bubo. Much vomiting. Excessive delirium. Albumin in urine. Bronchopneumonia and rise of temperature just before death to 108°. Admitted on the sixth day of disease and died twenty-eight hours after admission.

Perhaps the sole characteristic common to the majority of temperature-charts of plague is a marked irregularity in the curve. There is very commonly a tendency to a morning fall and an evening rise in temperature, but rises and falls in temperature may occur at any period of the day. Sometimes it is possible to trace the rise to some definite cause, such as the onset of secondary pneumonia or the occurrence of suppuration in the bubo, but quite as commonly a rise in temperature may occur without any obvious cause. Sudden falls of temperature, equally without apparent reason, are by no means uncommon, and may occur at any hour of the day. A fall of some degrees on the second or third day of the attack is not infrequent, and has been regarded by some as a feature characteristic of the disease; it is, however, very often absent. In some cases falls of temperature can be definitely traced to a cause, such as the occurrence of collapse from heart failure, but in a

large number of cases no obvious cause can be discovered. A knowledge of this fact is of importance in judging of the efficacy of certain forms of treatment, as it is quite possible that falls of temperature ascribed to the particular form of treatment would have occurred under any other treatment or with no treatment at all.

At the same time there is no question that high temperatures in plague can, with very considerable ease, be artificially reduced by appropriate remedies, such as antipyretics, the hot- or cold-pack, and diaphoretics. In view of the facts above stated as to the relation of the height of the temperature to the severity of the disease, it seems a rational plan to endeavor to reduce the temperature when it rises to a dangerous height. The method may not, perhaps, be based upon quite faultless reasoning, for it may, with full justice, be argued that the high temperature which is so frequently followed by death is not in itself the danger or the cause of death, but merely an index of the tissue and other changes resulting from the action of the toxins or bacilli, or both, circulating in the blood, and that merely to reduce the temperature is not to strike at the cause of the disease. But, on the other hand, it will be found in practice that an artificial reduction of temperature does not only relieve the patient from much suffering, but also appears to in some degree influence the course of the disease for good. The method I have most usually employed is the administration to any patient whose temperature rises above 104° of fifteen grains of phenacetin dissolved in hot rum and water; immediately after the dose the patient is placed in the hot-pack, and perspiration may be further encouraged by a dose of spirit of nitrous ether. Any depressing effect which the large dose of phenacetin might have had appeared to be counteracted by the hot spirit in which it was given. The hot-pack was invariably used in preference to the cold, and I have no personal experience of the effects of the latter. The indications of the disease would certainly point rather to the use of the hot- than of the cold-pack. The skin is usually excessively hot and dry, the functions of the sweat-glands are inhibited, the internal organs are frequently congested, and the kidneys more or less affected, if not in a condition of nephritis. Under these conditions, with an overwhelming quantity of toxins or bacilli, or both, circulating in the blood, it would appear most desirable to encourage in every way the action of the sweat-glands, and the application of an ice-pack would seem, *à priori*, to be fraught with no little danger. No doubt a more rapid reduction of temperature can be effected by the latter method, and it is right to add that in some other hospitals, notably in the Arthur Road Hospital, Bombay, the cold-pack was almost invariably employed, and, it was stated, without any unfavorable results. Native plague patients, however, greatly dislike this form of treatment, and unless very clear benefit can be proved to have been derived from it, this fact may well be

taken into consideration, and the patient spared such unnecessary discomfort as the application of an ice-pack implies.

Fears have been expressed as to the wisdom of reducing a high temperature in plague by artificial means, as in the course of the disease the sudden falls of temperature which occur independently of treatment are by some regarded as of unfavorable prognostic import. I am far from feeling sure that such falls of temperature are rightly so regarded. In a disease such as plague, where the mortality ranges between 70 and 90 per cent., and death is therefore the rule rather than the exception, it is easy to regard almost any indifferent but fairly common feature of the disease as of unfavorable import, and this has, I think, been the case in regard to falls of temperature. Such falls certainly occur in cases which recover, and unless the fall is very great, and the result of some obviously unfavorable cause, such as collapse from sudden heart failure, there would seem to be no reason to regard falls of temperature as of necessity bad prognostic signs, or to refrain from producing them by artificial means.

Occasionally a very extreme fall of temperature, accompanied by an excessive degree of collapse and heart failure, is recovered from. The following is the most remarkable instance of the kind that has come under my own observation.

CASE IV. (Register No. 917).—Hindoo, male, aged twenty-seven years. Admitted to the Parel Hospital, Bombay, March 19, 1898, with a history of two days' illness. The case was a fairly typical one of plague, with right axillary bubo. There was troublesome vomiting. The urine was free from albumin. On March 21st the temperature at 6 P. M. was 103°. At 8 P. M. I was hurriedly summoned to the ward by an attendant, who reported that the patient had thrown himself out of the window. This was easily proved to have been impossible, and what had obviously happened was that the patient had got out of bed, had descended a steep staircase which was quite near the ward, and, after walking some little distance along a veranda on the ground floor, had collapsed from heart failure. Almost immediately after he was missed, and on search being made he was found lying where he had fallen, on the veranda. He was removed to bed, where I found him deeply collapsed, quite unconscious, pulseless, and to all appearances moribund. The temperature had then fallen to 98.4°, and at 6 o'clock the next morning it was only 95.8° (or 7.2° lower than it had been on the previous evening). The treatment was confined to the free exhibition of stimulants and the application of warmth, and, contrary to all anticipations, he began rapidly to improve from the time of the *contretemps* described. There were five loose motions during the night. At 9 o'clock next morning he was conscious and answered questions rationally, but had no recollection of the previous night's incident. The tongue was cleaner, but very pale; the pulse was extremely weak, the speech slow and thick, the vomiting had ceased and did not recur; the urine was still free from albumin; there was some cough, but the chest was normal. On the following day (March 23d) the general condition was

greatly improved and the pulse much stronger; the temperature varied between 96.4° and 98°. On the 24th the bubo in the right axilla had completely disappeared. Convalescence was uninterrupted, and the patient was discharged, cured, on April 12th.

In cases which recover, the temperature falls to the normal gradually in the course of two, three or more days, rather than suddenly; in other words, resolution of the disease is usually by lysis and not by crisis. Occasionally, however, recovery is preceded by what appears to be a critical fall of temperature. Convalescence may be interrupted by more than one rise of temperature, due either to some obvious cause, such as the appearance of a fresh bubo, or the onset of some intercurrent affection, or due to some cause which baffles all efforts to discover. In malarial subjects suffering from plague repeated rises of temperature may occur throughout the illness and well on into convalescence, and in such cases the temperature-curve may be of a somewhat puzzling character unless the possibility of malaria be remembered.

The Alimentary System. The state of the *tongue* in plague varies very considerably. Perhaps the commonest and most characteristic condition met with is one in which the dorsum of the tongue is loaded with a white or grayish-white fur. This coating of fur is usually dry on the surface; sometimes it is remarkably smooth, and when the smooth fur is, as it occasionally is, moist on the surface, the tongue may present an appearance somewhat remotely resembling mother-of-pearl—an appearance which some observers have described as characteristic of the disease. However thick the fur may be on the dorsum, it is very noteworthy that the tip and edges are, in the great majority of cases, clean, pink, and free from fur. The edges of the tongue are very frequently indented by the teeth.

While the characters just described may be regarded, for convenience sake, as those most typical of the tongue in plague, it is of great importance to remember that in a very large minority of cases the tongue may be absolutely atypical. In not a few cases the tongue is remarkably little affected and only covered with a very thin coating of white or yellowish fur, through which the papillæ may be very clearly visible and apparently unusually prominent. In a rather larger number of cases the tongue is covered with a thin, dry, light-brown, quite glazed and shiny coating, and presents no feature in common with the so-called typical tongue, except in the freedom from fur of the tip and edges.

The degree of coating of the tongue does not appear to bear any very close relation to the severity of the attack. A heavily furred tongue is often met with in patients who ultimately recover and a lightly furred tongue in the most severe and fatal cases. The brown and glazed tongue more often than not indicates a severe attack; it is apt to pass on into the "typhoid" tongue, which will be referred to later, and this

is usually accompanied by a general typhoid condition, from which patients rarely rally. In a few cases in which diarrhœa was a prominent symptom, either during the acute period or in convalescence, the tongue was moist, bright red, glazed, and appeared to be to some extent denuded of epithelium.

One of the most highly characteristic features of the tongue in plague appears to me to be the very marked and rapid changes which it may undergo. A tongue which to-day may be typical may be quite atypical to-morrow, and *vice versa*. A thick coating of fur may almost completely disappear in twenty-four hours, and it may again appear in the course of another twenty-four hours. Sometimes the thick fur on the dorsum becomes brown and glazed in patches. A common occurrence is for the white-gray fur on the dorsum to dry up and become brown on each side, but not in the middle, which remains white or gray; the tongue has in such cases five distinct zones from side to side—viz., pink edge; dry, brown, and caked fur; white or gray centre; dry, brown, and caked fur; pink edge. This change seemed to be a very common and characteristic one. Rather less commonly it is the centre zone which turns dry and brown, leaving lateral zones of gray and white.

When the disease terminates in recovery, the tongue clears slowly or peculiarly rapidly. In the latter event, the fur, with or without a preliminary change to the dry, brown, and caked condition, may peel off in quite large flakes, which leave behind them pink, moist, rather raw-looking patches. This rapid peeling of the tongue in flakes cannot, unfortunately, always be regarded as forerunning recovery. It may occur in the acute period as one of those sudden and apparently inexplicable changes which, as just stated, are characteristic of the disease. It may even precede death by only a few hours. In a severe case which will be quoted later (Case XI. of this paper) the tongue cleared in this way on the seventh day of the disease, with no real improvement in the patient's condition, and the patient died eight days later. In the following case the tongue, which had been "typhoid" in character, was peeling in large flakes at the time death occurred.

Case V. (Register No. 850.)—Christian, male, aged twenty-three years, admitted March 13, 1898, with a history of eleven hours' illness. The temperature on admission was 105.2°; the tongue was coated with a thick, white fur. There was a left axillary bubo, and six days later a left inguinal bubo appeared. There was some vomiting, which yielded to treatment, on March 16, and on the 17th the tongue was cleaner. On the 20th (a fresh bubo having appeared on the 19th) the tongue was dry, caked, and cracked, and dry sordes had collected around the teeth. On the 22d the pulse was very rapid (164) and weak; there was great emaciation and pallor. There were profuse moist sounds over the lungs. The urine was free from albumin throughout. On the 23d

the tongue was very dry, caked and brown, and the general condition was typhoid, though the pulse was slightly better. On the 24th the patient was extremely weak; at 9 A.M. the respiration was 64 and very shallow; the pulse was almost imperceptible. The patient was semi-conscious. In spite of this hopeless condition the tongue was clearing, the fur peeling off in thick flakes. Death occurred less than two hours later (at 10.50 A.M. on the 24th).

Many plague patients pass into the typhoid state, the tongue in such cases becoming caked and brown, as in the case just quoted, and the lips and gums covered with sordes, either dry and caked or viscid and tenacious in character. The prognosis in such cases is practically hopeless. I have not preserved notes of a single case in which recovery from this condition ensued, nor can I recall such an occurrence.

Tremulousness is a character of the tongue which is very far from uncommon in plague. It is to be regarded rather as an indication of the general muscular weakness which characterizes the disease than as a feature special to the tongue. Very often the patient is apparently unable to protrude the tongue through sheer exhaustion, while in a still larger number of cases the tongue cannot be examined, owing to the mental condition of the patient, which prevents him or her from understanding what is required.

Vomiting. At some period of the disease vomiting is unquestionably a common accompaniment of plague—quite common enough to make it rank among the diagnostic symptoms of the disease. In going through the case-sheets of 502 patients I find that vomiting is recorded in only 68 instances. I am quite convinced, however, that this does not represent a true proportion of the cases in which it was present. In some instances it doubtless occurred in hospital, and escaped being entered on the case-sheet, while in still more I have little doubt that there was vomiting before admission, or soon after the onset, and that it had escaped record.[1] I have formed this opinion principally from the fact that in cases, both in Bombay and Calcutta, where I was able to take the history myself, vomiting was, with rare exceptions, found to have occurred.

Vomiting is usually an early symptom, and in not a few cases it is the very earliest symptom of all, preceding by a short interval the onset of the "initial" rigor and headache. On the other hand it may, and not infrequently does, occur at later periods, either during the acute stages or in the course of convalescence. It would appear in very many cases to be of cerebral origin, the vomiting occurring independently of food, and retching continuing long after the stomach is emptied. In a

[1] I am desirous to avoid any appearance of charging the native hospital assistants (who usually took the history of the cases) or the nurses with carelessness or neglect. One and all were most zealous in the performance of their very trying duties. It is always difficult to obtain an accurate history from a native patient or his friends.

few cases it will be found to be very persistent and difficult to control; but, as a general rule, the vomiting of plague is not a very troublesome symptom. It can generally be checked by the ordinary remedies, such as ice to suck, sinapisms and poultices to the pit of the stomach, and the usual internal anti-emetics. Sedatives and hypnotics are almost invariably required to control the mental and nervous symptoms which are so prominent in plague, and these will generally be found useful in checking the vomiting, particularly when it is of cerebral origin. The exhaustion caused by excessive vomiting is so great that the symptom should, if possible, be checked and controlled from the beginning.

Hæmatemesis is said to occur with some frequency in plague. I have observed it in two cases only. In both it occurred very shortly before death.

The state of the bowels in plague is usually, but not invariably, one of constipation. This is probably due in part to a diminished activity of the intestinal glands. All glandular structures in plague appear to have their secretory functions either diminished or inhibited altogether. This is particularly marked in the case of the sweat-glands, which, in the majority of cases, are almost completely inactive, the skin becoming in consequence excessively hot and dry. The action of the kidneys is, in like manner, very frequently interfered with, and the amount of urine markedly diminished. In some cases considerable sluggishness of the bile-secreting functions of the liver is indicated by the color of the stools. The salivary and lingual glands are similarly inactive, with consequent dryness of the tongue and mouth. It is only reasonable to suppose that the intestinal glands share in the general inactivity, and that the constipation is largely a result of this. Equally probable the constipation is favored and increased by the muscular weakness and paresis, which would seem to be common to all muscular structures, whether striped or non-striped, throughout the body, and which is doubtless due in part to the direct action upon the muscular fibre of toxins circulating in the blood, and in part to their indirect action through the nervous system. The constipation of plague should always be relieved. The majority of patients received, on admission to hospital, either a large dose of calomel or an ounce or more of castor oil. Considerable relief, if only temporary, is afforded to many of the symptoms by thoroughly cleaning out the alimentary canal.

While constipation is the rule in a typical attack of plague, cases in which diarrhœa occurs are by no means rare exceptions. It may be present either during the acute period of the disease or during convalescence. Occasionally it is somewhat persistent and a cause of some delay in the recovery of a patient; but, as a rule, it is checked without much difficulty by the ordinary remedies for diarrhœa. If only slight, it is unnecessary to check it, and, perhaps, unwise to do so, particularly

in the acute stage, when its eliminating action may possibly be of value. But if at all troublesome it should be controlled, as, if unrelieved, it can only still further weaken a patient already prostrated by one of the most exhausting of all diseases.

A loose motion or series of loose motions may occasionally occur just as the acute symptoms are passing off in a case which is going to end in recovery, and in such cases they may be regarded as critical evacuations. This was the case in the patient whose history has already been given (Case IV. of the present paper). There, it will be remembered, the extreme fall of temperature which followed his adventure was accompanied by five loose motions, and the patient from that time onward progressed to an uninterrupted recovery. Diarrhœa sometimes occurs before death in fatal cases, and the involuntary passage of a loose stool or a succession of loose stools is a not at all uncommon precursor of death.

The frequency of round-worms in both stools and vomit of native plague patients in India deserves mention. It is of little clinical import, but it is well, particularly in children, to give an anthelmintic and clear the bowels of these and other parasites. The measure has little obvious influence on the course of the graver disease, but it can but be right to remove so powerful a source of nervous irritation as worms are known to be.

Hemorrhage from the bowels did not occur in a single instance in the plague cases I have seen, or if it did occur, it was never sufficiently great to be observed by the nurses or ward attendants, who would certainly have called attention to it. A small amount of blood in a stool may, in some instances, have escaped notice. After death hemorrhagic patches in the mucous membrane of the stomach and intestines are far from uncommon, and it is beyond question that in some cases blood may escape into their lumen. But, as just stated, it never did so to an appreciable extent in the cases under my care, and, so far as my experience of plague is concerned, both in Bombay and Calcutta, it does not support the opinion expressed by so many of the older writers upon plague, that the passing of blood from stomach and bowel is a common symptom of the disease.

Physical examination of the abdomen rarely shows any marked or characteristic deviation from the normal. The liver is occasionally enlarged, but seldom to any great extent. I have never seen jaundice complicating plague, but some degree of icteric tingeing of the conjunctivæ is very common. It is often masked, however, by the deep injection of the conjunctival vessels, which is so common in plague. Local abdominal pain or tenderness is not a feature of the disease, but when the deep iliac glands are enlarged, as they frequently are in addition to the superficial inguinal glands, then there may be much pain and ten-

derness over the lower part of the abdomen. The state of the spleen will be discussed under the hæmopoietic system.

That the alimentary canal shares in the effect of the general toxæmia of plague is shown by the post-mortem appearances. As already stated, hemorrhagic patches, either pinkish-red or more dusky and purple in color, are met with in the mucous membrane of the stomach and of the small and large intestines. More commonly they are seated just under the serous coating of these organs; they vary in size from mere points up to patches the size of a sixpence or larger. Peyer's patches and the solitary glands rarely show any change from the normal, except a tendency to be rather more prominent than usual. The liver is frequently quite normal in appearance, but in some instances it was found rather enlarged and much congested. Hemorrhages are frequent in the peritoneal covering of the liver, and particularly along the line of reflection of the falciform and other ligaments, where dusky purple or pinkish patches are very common. The liver, on section, has often a peculiarly shiny and glazed appearance; it is frequently deeply engorged with blood, and occasionally minute red points are seen scattered over the surface, which appear to be punctate hemorrhages into the substance.

The Nervous System. Almost from the first the nervous system is more or less profoundly affected in plague. In this respect, as in others, the analogy of plague with typhus fever is striking. It would seem that the plague toxins circulating in the blood, while affecting in some degree every system and tissue in the body, have a specially intense action upon the entire nervous system, both cerebro-spinal and sympathetic. This is indicated by the headache and giddiness which accompany the outset; by the extreme degree of physical prostration and weakness which characterize the later stages of the disease; by the mental phenomena, such as apathy, delirium, drowsiness or coma, which are rarely absent; by the convulsive and paralytic symptoms which occasionally occur; by the mental changes which are sometimes left as one of the most unfortunate sequelæ of plague; and by the trophic manifestations which are common accompaniments of the disease.

At the time of onset some degree of *headache* is almost always complained of; it is most usually frontal, and is quite as commonly bilateral as unilateral. In many patients it is extremely severe, and appears to cause more suffering than any other symptom. It is usually accompanied by a greater or less degree of giddiness, and, as stated before, by nausea or vomiting. Aching of the back and limbs is also in some instances complained of.

Some degree of *physical prostration and weakness* is present in almost every case of plague, and more often than not it is present in an extreme degree. The voice becomes weak, the muscles flaccid, and the patient appears thoroughly prostrated. In many patients this appearance

manifests itself from the very beginning. Occasionally, however, during the first two or three days of the illness a patient may show little signs of weakness or depression of vital powers, and, although admittedly ill, and willingly confined to bed, may retain a strong natural voice, a general appearance of health, and an almost normal degree of muscular strength and bodily energy. Unfortunately, such cases are often cruelly deceptive. A change for the worse may set in at any moment, and in the course of a single hour a patient who may have buoyed himself with the hope that he was suffering from that delusive thing "a mild attack of plague," may be delirious, prostrate and almost moribund. A "mild attack of plague" is indeed a contradiction in terms. No case in which the diagnosis of plague is certain, however apparently "mild" it may be, can be regarded without grave apprehensions for the result until convalescence is thoroughly established.

The *mental condition* of plague patients varies greatly. Very few of those admitted to hospital are entirely free from some departure from the normal in their mental state. Apathy and indifference to their surroundings are very common symptoms. Some degree of drowsiness, passing on in not a few to complete coma, is equally frequently met with. Many such patients seem to desire nothing more than to be left alone and undisturbed. They lie either supine or upon one side, and may appear to be enjoying quiet and normal sleep. But they are not sleeping—they are in a state of what is apparently complete mental and physical inertia. They can easily be roused, and appear to understand more or less clearly what is said to them, and may tardily comply with requests (such as to put out the tongue), but they resent all interference, and after giving monosyllabic replies to questions, or no replies at all, at once relapse into their former attitude and lethargic condition.

The more or less sudden changes, already referred to more than once as common in this disease, very frequently supervene on the condition just described; and it is no uncommon thing for a drowsy and lethargic patient to suddenly become noisily delirious, or for one who to all appearance had lost all muscular strength and energy suddenly to develop an almost maniacal strength and to require several persons to aid in holding him or her in bed. Such accessions of strength rarely last very long, and the patient generally, after a longer or shorter period, relapses into the lethargic state, to all appearances more prostrated than ever.

Some degree of delirium is among the commonest of mental phenomena in plague. It may be present in any degree, from a mere occasional incoherent or irrelevant remark up to the most alarming form of maniacal delirium. In the acute stages of the disease it is, perhaps, more often than not a noisy, talkative form that the delirium assumes. Delusions, illusions and hallucinations are all met with in this period of the dis-

ease, and these may either be of an unpleasant or terrible character, causing the patient much suffering and fear, or they may be pleasant and agreeable in character, the patient in such cases smiling and laughing and showing every sign of enjoying the scenes and surroundings which his disturbed brain has conjured up. In the noisy form of delirium patients almost invariably attempt to get out of their beds, and it is often only with the greatest difficulty that they can be prevented from doing so. In view of the extreme danger of a sudden change to the upright position and sudden exertion on the part of plague patients being followed by heart failure, collapse and perhaps immediate death, it is of the utmost importance to guard against this risk. In the Parel Hospital every patient as soon as he or she showed any sign of mental change was at once tied in bed by means of soft bandages, and strict instructions were, of course, given to nurses and attendants to prevent patients from suddenly sitting up or getting out of bed for any purpose whatever. In the apathetic state the majority of patients showed little objection to their arms and legs being tied; while as regards patients in the noisily delirious state, though many strongly objected to the process, and fought and struggled to get rid of their bonds, it was absolutely necessary, for every reason, to tie them in bed. Without some such measure the wards and corridors of the hospital would at times have been thronged with wandering, delirious and perhaps maniacal patients, who appear to prefer any place to their own beds. In no instance was any injury produced by the bandages; while it may with safety be claimed that many lives were saved by the precaution. But, with all our precautions, it was not possible to prevent some unfortunate accidents, and more than one patient suddenly sat up in bed and as suddenly collapsed from cardiac failure.

While a noisy, talkative delirium is the form rather more commonly met with, a low muttering delirium is far from infrequent. The one form may, and often does, pass into the other, particularly in the later stages of the acute period. This form of delirium is a very common accompaniment of the typhoid state into which many patients fall. Such patients usually lie on their backs, their tongue and mouth in the condition already described as characteristic of this state; they are unconscious of their surroundings, they mutter incoherently either continuously or at intervals; they frequently pluck at the bedclothes; and involuntary evacuations of both bowel and bladder may occur. Death almost invariably ensues at no long interval after the patient has fallen into this condition.

The delirium can in many instances be checked by appropriate remedies. The bromides are sometimes sufficient by themselves. They may be aided or replaced by chloral hydrate, by opium and its derivatives, by sulphonal or paraldehyde. The noisy form of delirium must be

checked, if possible, in hospital patients, as much for the sake of others as for that of the patient himself. Frequently it is necessary to give large and repeated doses of morphine or other sedative to quiet a noisy patient. The injectio morphiæ hypodermica is the most useful form of administration, in doses of 2 or 3 minims. Sulphonal, in doses of 15 grains, also proved a valuable remedy, given either at night only or night and morning.

Many patients pass into a condition of more or less complete coma. In most fatal cases the patient becomes unconscious for some hours before death. The coma which precedes death may be accompanied by the typhoid state already described, or it may be associated with Cheyne-Stokes breathing; with stertorous respiration; with *risus sardonicus* and other convulsive symptoms; with relaxation of the sphincters; with the state known as coma vigil, or with two or more of these symptoms.

Convulsions are not infrequently met with in plague patients, and some observers have proposed to make a convulsive type of plague. The spasms may be unilateral or bilateral. Sometimes they appear to involve every muscle of the body Opisthotonos may occur. The spasms may be either tonic or clonic, or first one and then the other. They may come on quite suddenly, without any apparent cause; in one case, quoted below, they developed after an accident to the patient, who fell out of bed and badly bruised her head If the convulsive seizure is at all severe or prolonged, consciousness is lost, and the attack resembles in every respect an epileptic fit. The attacks may be repeated several times at short intervals, or even for a day or more. In one case convulsions occurred at intervals varying from a few minutes up to three or four hours for three successive days before death. But more often the great exhaustion caused by the spasms seems to hasten death, and patients rarely survive severe or repeated convulsions for many hours. The second of the two following cases was the only one I have seen in which severe convulsions were survived for a considerable period, and in which, though death subsequently occurred, it was not in any way hastened by the convulsions.

Case VI.[1] (Register No. 838).—Female, Hindoo, aged twelve years, admitted to the Parel Hospital, Bombay, at 1 A.M. on March 12th, with a history of five days' illness, characterized by rigors, coughs and fever, and by diarrhœa for the two days previous to admission. On admission the temperature was 100°; the skin was hot and dry; the tongue was thickly furred; the conjunctivæ lightly injected; pulse small; lungs normal; there was a right inguinal bubo. During the morning of the day of admission the patient appears to have fallen out

[1] This and all other female cases were under the care of Miss Corthorn, M.D., for the greater part of the period during which I was in charge of the Parel Hospital. I gladly acknowledge her courteous permission to make use of the notes of her cases.

of bed. A large hæmatoma developed on the forehead, and severe convulsions set in. At 3.30 P.M. the following note was made: "The patient is convulsed and unconscious; the pupils are widely dilated and inactive. There are frequent tonic spasms of the whole body, going on to opisthotonos; the legs are widely extended, the arms are flexed and the hands clenched, and there is grinding of the teeth. The rigidity lasts about two minutes and is succeeded by clonic spasms of the whole body. The urine is passed involuntarily. The temperature is 105°." Death occurred five minutes after this note was taken.

CASE VII.—E. G., male, Madrassee, native Christian, aged eleven years. The boy returned from Madras, where he had been living for some months, to Calcutta on February 27, 1899. He remained well until March 12th, when he was seized with vomiting, high fever and delirium. I first saw him on the afternoon of March 14th. He was then semi-conscious; the temperature was 102.8°, pulse 144, respiration 50. The conjunctivæ were deeply injected. In the right groin was a tender bubo the size of a walnut; vomiting was very troublesome, nothing being retained. There was some cough, but no expectoration. During the day he had been repeatedly convulsed. An attack occurred before I left the house. The spasms were bilateral, clonic, and general throughout the body; there was slight opisthotonos, the pupils were dilated, and the tongue bitten. The patient was removed to the Medical College Hospital, where he was under the care of Captain Bird, I. M. S. He lingered on for thirteen days, and died on March 27th of secondary pneumonia and exhaustion. The convulsions ceased at no long interval after admission to hospital, but I have, unfortunately, no note of the exact day and hour at which they ceased. The survival of this patient for so long a period was as remarkable as it was unexpected. His condition when seen by me on March 14th was so grave that I had much hesitation in ordering his removal to hospital, as I feared he might not survive the journey.

Sometimes a local spasm of a muscle or a group of muscles is met with. In one case the spasm was confined to the facial muscles of the left side. In another it occurred in both hands. The contraction of the facial muscles, which causes the appearance of *risus sardonicus*, is by no means uncommon. Such partial or local spasms are apt to occur during the last stages of fatal cases, within the last few hours preceding death; in the actual throes of death local and general spasms are very frequently observed. Nystagmus was present in one case; the patient was a Hindoo female, aged eighteen years, who had a fairly typical attack of plague, accompanied by a right axillary bubo and vomiting; she recovered. The following are notes of a case in which there were bilateral spasms affecting the same group of muscles on each side:

CASE VIII. (Register No. 863).—Muhammadan female, aged twelve years, admitted to the Parel Hospital at 9.30 A.M. on March 15, 1898, with a history of illness commencing with rigor on the previous evening. On admission the temperature was 104.2°, pulse 132. There was extreme drowsiness; in the right groin was a tender bubo. At 2 P.M.

on the day of admission there were slight convulsive movements of both hands, the thumbs were bent in on the palms, and the fingers were extended. The pupils were contracted. Death occurred at 1 o'clock on the following morning.

Hiccough is not very rarely met with in plague. It is a symptom of very grave import; if at all prolonged, the exhaustion which it causes appears to hasten death. It can sometimes be checked by appropriate remedies; but it is apt to recur and persist, refusing to yield to all treatment until death. The following are notes of a case of this kind (in Case XI. hiccough was also present, but it was easily controlled, and, though death occurred, there is no reason to suppose it was hastened by the hiccough):

CASE IX. (Register No. 818.)—Goanese male, Christian, aged twenty-one years. Admitted to the Parel Hospital on March 8, 1898, at 9.15 A.M. The attack had commenced at midnight, with fever, and pain and swelling in the left groin; there had been slight headache; no giddiness. On admission the temperature was 100°; the pulse was fairly full, but soft and compressible, 112 per minute. The patient was quite conscious; the speech was clear, the voice strong, and the patient, who was of unusual muscular strength and development, showed little appearance of being ill. The tongue was lightly coated with white fur, slightly tremulous, pink and clean at the edges. There was a slightly tender bubo, of the size of a walnut, in the left femoral region. On the 8th, 9th, and the morning of the 10th of March the patient's condition remained excellent; the pulse was fairly strong; there was no vomiting, and no delirium or other mental symptom; but on the afternoon of the 10th a change for the worse suddenly set in, and at 6 o'clock hiccough commenced and became very troublesome. It was kept in check by the sucking of ice, the application of sinapisms, and the exhibition of morphia, bromides and tincture of capsicum. At midnight the temperature was 103°, pulse 100, and respiration 36; there was some delirium, and the general condition was markedly worse. He slept but little during the night. At 6 A. M. on March 11th he was still delirious; the pulse was becoming weak; the hiccough had returned. There was a rapid increase in the general weakness; the pulse became very small, and the patient sank, and died at 9.15 A.M. There seemed little room for doubt in this case that the hiccough hastened the end.

Paralytic affections are also met with in plague. The general weakness or paresis of muscular structures throughout the body which characterizes the acute period has already been referred to. It would appear to be, in all probability, in part the result of a direct action upon the muscular fibres of the toxins circulating in the blood. True paralysis of any muscle or group of muscles, of clearly nervous origin, and pointing to the presence of some lesion in either the cerebral cortex or some part of the motor tracts, I have never seen in plague. Such paralyses are said to occur in the disease, and other observers have reported the occurrence of paraplegia, hemiplegia, or monoplegia, either

as accompaniments or sequelæ of an attack of plague. They were not, however, present in a single case that came under my care. A marked degree of weakness, amounting to paresis, but not to a complete paralysis, of all the systematic muscles is occasionally left after a very severe and prolonged attack of the disease, and this is usually accompanied by an equally severe change in the mental condition of the patient. The following case is a characteristic example of this condition:

CASE X.—Male, Hindoo, aged eighteen years. This patient was in the wards at the time I took charge of the hospital. He had passed through a severe attack of plague, and was then "convalescent." For the following eleven weeks he lay in bed, aphasic, apathetic, and entirely indifferent to his surroundings. For the greater part of the time he was unable to walk or stand alone. Toward the end, as the result of persistent practice and massage, the muscles gained strength, and he could stand and even take a few steps without support. Much of his inability to walk or stand was unquestionably due to mere stiffness and want of use of the muscles and joints from his prolonged confinement to bed; but much of it was also due to a real paresis of the muscles, and not a little of it was the result of his mental condition.[1] His mental state seemed to have returned in many ways to that of an untaught child, and he appeared to require to be taught how to walk over again, just as he required to be taught talking and habits of cleanliness. He occasionally, and at one time frequently, passed his motions and urine in bed, apparently from indifference as to the results rather than from any paralysis of the sphincters. He suffered throughout from a succession of pemphigoid bullæ in various parts of the body, which burst or were opened, and left rather slowly-healing ulcers. There was considerable wasting, and in general his state as regards tissue-nutrition appeared to be at a very low ebb. He took food, however, well, and there was no disturbance of the digestive organs. His mental and bodily condition very slowly improved. Toward the end of the period he appeared to understand what was said to him and attempted to speak; his lips appeared to form words, but he was unable to produce any sound above the faintest whisper, and it was impossible to tell whether the movement of the lips was an attempt to form intelligible words or mere meaningless sounds.

Among paralytic symptoms may be mentioned the occurrence of ptosis, on the left side in one case. Paralysis of the sphincters, with consequent passage of the motions and urine in the bed, frequently occurs in the late stages of the acute period in fatal cases.

Affections of the speech, though not always of paralytic origin, may be conveniently dealt with here. Some interference with speech is one of the commonest and most striking features of plague. In the acute stage of the disease, before delirium has set in, the speech is, in the large majority of patients, slow, hesitating and peculiarly "thick" in character. In very many patients the speech resembles exactly that of a

[1] There were, unfortunately, no means for testing the electric condition of the muscles.

person in the early stages of alcoholic intoxication, and the term "thick," so often applied to the speech of a man who has taken more drink than is good for him, expresses more nearly than any other word the character of the speech most commonly met with in plague patients. Not infrequently there is some degree of "scanning" in the speech; but most commonly the words are imperfectly pronounced, and there is a tendency to slur over syllables, particularly at the end of words. The interference with speech at this period appears to be due in part to the muscular weakness which affects the tongue, just as it affects all the other muscular structures, and, in part, to a certain loss of co-ordinating power. That the co-ordinating centres in the cerebellum are disturbed is indicated by the character of the gait in the early stages of plague. If the patient attempts to walk, he rolls from side to side, exactly like a drunken man, and in a manner which is evidently in part due to muscular weakness and in part to loss of co-ordinating control. These two factors would appear sufficient of themselves to account for the character of the speech in the early stages of the disease, though possibly even at this early period the centres for speech are, in common with most of the higher cerebral centres, suffering from some degree of functional disturbance caused by the action of the toxins circulating through them.

In the more advanced stages of the disease the affections of speech would appear to be of twofold character: First, affections due to local disturbances of the mechanism of speech; and, second, those caused by central nervous disturbances. Among the local causes which interfere mechanically with speech is the condition of the tongue. This organ is occasionally so coated with brown, dried and caked fur as to be practically useless for the formation of words, and in this state, if the patient's mental condition permit him to speak, his speech may be almost incomprehensible from the unpliable condition of the tongue. The muscular weakness already mentioned persists in this later stage, and continues to increase, and in not a few cases the exhaustion is so great that the patient seems to lack muscular strength sufficient to move tongue and lips to form words, or to vibrate the vocal cords and produce sound. In patients with large buboes in the cervical region speech may be mechanically interfered with in more than one way. In its least serious form the interference with speech is the result merely of some stiffness and difficulty in opening the jaw, owing to involvement of the parotid gland on one or both sides. In such cases the speech is exactly like that of a person suffering from mumps, and for exactly the same reason. In more serious cases there may be widespread infiltration and œdema around and beneath the cervical tumor, extending to and involving all the deep structures of the neck, including the pharynx, base of the tongue and the glottis itself. In this condition not only is speech almost impossible, but respiration may be dan-

gerously obstructed. Not infrequently, in cases with cervical bubo, the attempt to bring into action the muscles of speech is so painful that the patient, though able to speak, naturally shrinks from doing so.

The speech affections of central nervous origin in plague require closer investigation than they appear as yet to have received. It was pointed out above that the indistinct speech met with in the early stages of the disease may possibly be the result of some functional disturbance of the higher speech centres. In the later stages there would appear to be in many patients a more profound disturbance of these centres, and in a few cases this may be of a lasting or possibly of a permanent character, leading to a more or less prolonged or to a permanent condition of aphasia. Serious speech affections of this nature appear to be generally associated with more or less profound changes in the patient's mental condition, and in the few cases I have seen in which aphasia was continued throughout convalescence there was serious mental change of the nature either of imbecility or of a return to the mental condition of childhood. On the other hand, such serious mental changes may follow an attack of plague without being accompanied by true aphasia.

In what proportion of cases the absence of speech which is met with in many patients in the lethargic period of an attack of plague is due to a disturbance of the nerve centres, and, therefore, a true aphasia, it is not easy to determine. Many such patients, when aroused from their lethargic state, appear to understand more or less perfectly what is said to them, and may put out their tongue when told to; but they do not reply to questions, and either make no attempt to speak, or, if they do, only utter a faint, unintelligible sound. The true condition of the speech is always masked in these cases by the extreme weakness and by the local conditions already referred to. But it would appear probable that the entire absence of speech in patients at this period is in some instances due merely to lack of desire to speak, either through exhaustion or from the condition of the higher volitional centres; while in others the absence or unintelligible character of the speech is almost certainly the result of some special disturbance of the speech centres. That such disturbance does occur we know from its persistence in a small number of those patients who survive this period and recover; and inasmuch as for every patient who recovers some three or four die, it is only reasonable to suppose that for every patient who recovers with persistent aphasia the disturbance of the speech centres which causes it is present in three or four others who die.

The duration of the aphasic state in patients who recover from an attack of plague appears to vary. Whether or not it is ever permanent I am unable to say. The longest case which came under my own observation was that quoted above (Case X.). In that case aphasia

continued for at least eleven weeks, with only some faint signs of improvement during the later weeks. At the end of that period I left Bombay and lost sight of this and of all other patients who had been in the Parel Hospital.

The *changed mental state* (which may or may not be accompanied by aphasia), which is sometimes left behind after an attack of plague, has already been alluded to. Some degree of blunting of the mental faculties is far from uncommon as a sequelæ of the disease. Such patients have usually a vacant expression; they are apathetic and indifferent to what goes on around them; they are slow and perhaps awkward in their actions. Their higher volitional centres appear to be, for the time being, largely in abeyance. Occasionally such patients are peevish or fractious; or they are easily moved to tears on the slightest provocation, or on no apparent provocation whatever. They may be dirty in their habits. One patient of this kind, a male adult, persistently passed his motions on the floor of the convalescent ward he occupied. No amount of exhortation, reproach or punishment would cure him of this habit. He whined and cried like a child when reproved, but invariably repeated the act within the next twenty-four hours. Another case in which there was marked mental change was that of a child, a male Hindoo, aged nine years. He passed through a severe attack of plague accompanied by a right inguinal bubo which ulcerated on the surface, but did not suppurate. During the acute period he suffered from excessive delirium, which appeared to be accompanied by delusions and hallucinations of a painful character, causing the child great fear. He frequently uttered a cry of a curiously metallic character, and there can be little doubt there was some meningeal involvement. During convalescence the mental state was markedly peculiar. He was more or less rational and aware of his surroundings, but at short intervals he would give way to hysterical outbursts of crying without apparent reason. These outbursts were generally accompanied by signs of fear or alarm. Any attempt to examine him always brought on an attack of this kind. He was removed from the hospital by his relatives on the nineteenth day after admission, and was not seen again.

The *reflexes* in plague are almost invariably diminished or lost altogether. This is true of both deep and superficial reflexes, and their diminution or loss is met with not only in the acute period, but also well on into convalescence in patients who recover.

Ordinary *sensation* would appear to be to some extent diminished in the acute period of the disease, either from some changes in the excitability of the sensory nerves or nerve-endings, or more probably from a dulling of the receptive power of the centres for sensation in the brain, or from both of these causes. I have never, however, seen a condition of complete anæsthesia either local or general. The power of feeling pain

is also never lost (except, of course, in unconscious patients). This is especially marked in connection with the buboes; these are sometimes very tender, and the slightest pressure on them may cause a patient, even in the most pronounced state of apathy or semi-consciousness, to twinge and show signs of pain.

Retention of urine is a symptom of nervous origin which is extremely common. It, too, may be provisionally explained as due to the dulled receptivity of the sensorium just alluded to, the sensory centres being unaffected or imperfectly affected by even strong afferent impulses, and the patient being consequently unaware of the necessity for evacuating the bladder.

The *cerebral vomiting*, described under the alimentary system, is another symptom of nervous origin which only requires to be mentioned here.

The *organs of special sense* do not escape the action of the plague poison. The eyes in particular are apt to suffer. The degree of affection of the eyes may vary from the slightest amount of conjunctival injection up to inflammation and complete destruction of the entire eyeball. Some degree of conjunctival injection is rarely absent, and, as it is an early and constant symptom, it should always be looked for as an aid to diagnosis. In the majority of cases it leads to no further mischief in the eyes, and disappears as the patient becomes convalescent. But in a small number of cases it leads to a greater or less degree of conjunctivitis, with the usual pain, photophobia, and slight or profuse purulent discharge characteristic of that condition. The onset of conjunctivitis may be insidious and its progress rapid, and the eyes in all plague patients should, consequently, be regularly examined and appropriate treatment adopted on the first appearance of inflammatory signs. In some patients inflammation and ulceration of one or both corneæ develop. This happened in nine out of the 502 cases admitted to the Parel Hospital. Seven of these patients died, but the numbers are obviously too small to base upon them any conclusion as to the prognostic import of this complication. The character of the keratitis and ulceration, their diagnosis and treatment, appeared to differ in no respect from those of the same affections arising from other causes, save that in some of the cases the ulceration developed very rapidly and with apparently no preliminary stage of keratitis. Possibly the ulceration in such cases is a trophic lesion closely analogous to the local sloughings and necrosis of the skin which occur in different parts of the body, and will be described later. Possibly, too, it may be encouraged and favored by that diminished sensitiveness of the afferent nerves and nerve centres already alluded to, which would interfere with the conjunctival reflex and favor the retention of any minute irritant particles which might find their way into the sac. I have never, however, seen a case in

which the conjunctival reflex as tested by the finger was lost, except in unconscious and moribund patients.

Some degree of iritis occurred in four cases under my care—two of these cases recovered and the other two died. The iritis may be accompanied by the presence of pus in the anterior chamber. In one patient (who recovered) the iritis was accompanied by the appearance in the iris of a small yellow tumor, about the size of a hemp-seed, which had all the characteristics of a small, localized collection of matter. It was rapidly reabsorbed, and the patient recovered without any sequelæ in the eye. In both this case and in the other case with iritis which recovered a pterygion developed, but was reabsorbed without any after trouble.

In two patients, both of whom died, an acute inflammation of the entire structure of the eyeball developed. It commenced in each with an acute conjunctivitis, rapidly passing on to kerato-iritis, ulceration of the cornea and inflammation of the ciliary body. The inflammation spread rapidly in one case and slowly in the other, and appeared to involve the whole of the deeper structures of the eyeball; the cornea sloughed and perforated, allowing the escape of a mixture of water and pus, the eyes collapsed, and both patients died. In both the condition was bilateral. The following are the clinical notes of one of these patients:

Case XI. (Register No. 812).—Hindoo, male, aged twenty-one years. Admitted to the Parel Hospital March 6, 1898, with a history of three days' illness. On admission he presented all the appearances of a typical attack of plague. The temperature was 102°, pulse 130 and weak, respiration 32. The tongue was coated with white fur on the dorsum, but clean at the tip and edges. The skin was dry and the conjunctivæ congested. There was some headache; no cough. There was a right inguinal bubo. The notes on the further progress of the case are as follows:

March 6th (afternoon). The patient is very restless, delirious, and at times violent.

7th. The temperature was 99.8° at 5 A.M. and at noon; 101.8° at 6 P.M.; and 103° at midnight. The pulse was 124 at 6 A.M and 152 at 6 P.M.

8th (morning). The conjunctivæ are deeply injected, and the eyelids are glued together with pus; there are signs of commencing keratitis in the eyes. The tongue is coated on the dorsum with a dry, yellowish-gray fur, but pink and moist at the edges. The pulse is 144, irregular, compressible and weak. The respiration is 20, regular and shallow. The patient is drowsy, but at the same time restless and tossing about much, frequently throwing his arms about and turning from side to side. He is able to understand and answers questions, but the speech is indistinct and slow, and he tends to relapse into silence and drowsiness. There is a very tender bubo, the size of a walnut, in the right groin. The urine is acid and contains albumin. The temperature at noon was 98.4°. At 3 P.M., 24 c.c. of Yersin serum were injected in the flank,

and this was repeated on the four following days. At 7 P.M. the pulse was 156, very weak and compressible, respiration 30, temperature 103.4°. At midnight the temperature was 102.6°.

9th. The patient slept well. The keratitis is increasing.

10th. The pulse is much better, less rapid and stronger. The tongue is clearing, the gray, dried, and caked fur coming off in flakes. The keratitis is increasing in both eyes. This has been treated from the beginning with atropine drops and irrigation with boric acid lotion and a pressure bandage.

11th. There is nausea and some hiccough, which is controlled by treatment. There is occasional delirium.

12th. The patient slept badly. There is intense conjunctival injection and complete corneal opacity in both eyes. The tongue is much cleaner, but quite dry. The bubo has increased immensely in size, and now measures five by three inches; it is hard and tender.

13th. He was delirious and noisy in the night, but slept at intervals. Albuminuria is still present. The temperature has fallen to 99°.

14th. There is a large central ulcer in the left cornea; vomiting is very troublesome and cannot be controlled by treatment. The temperature was 97° at noon and 98.4° at midnight.

15th. The condition is unaltered, vomiting is still severe.

16th. A diffuse glandular swelling has appeared behind and below the right ear. The vomiting is slightly less severe, but still troublesome. There is constant delirium, and the patient is very restless.

18th. The general condition is unaltered. The bubo in the groin is unchanged, that in the neck is larger and is hard and tender; neither shows signs of suppuration. The patient is very weak, delirious, and restless. There is a condition of panophthalmitis in both eyes. The gums have become soft and spongy, and there is constant oozing of blood from them, the condition closely resembling that seen in scurvy. The patient died at 10.5 P.M. The temperature had been sub-normal (96°) since noon

The local sloughings and necrosis of the skin, to which reference was made above, should, if they are in truth, at least in part, lesions of trophic origin, be described in this place as affections of the nervous system. It will, however, be more convenient to discuss them later, when describing the external local manifestations of the plague.

(To be continued)

A REMARKABLE CASE OF PROBABLE THORACIC ANEURISM PRESENTING INTERMITTENTLY THROUGH THE STERNUM.

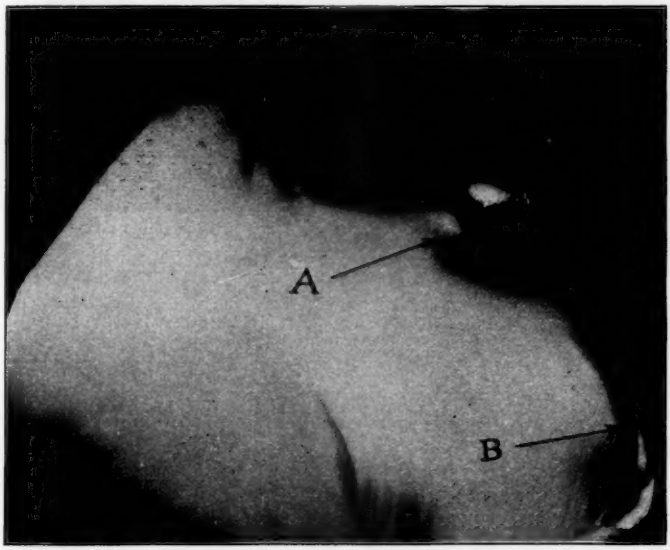
By Richard C. Cabot, M.D.,
PHYSICIAN TO OUT-PATIENTS AT THE MASSACHUSETTS GENERAL HOSPITAL.

In June, 1898, Mrs. H., aged forty-two years, came to the out-patient department of the Massachusetts General Hospital, seeking treatment, as she said, for an *aneurism*. Over the region of the manubrium was a pulsating tumor the size of a lemon, greenish-black at the tip, with a red

areola around the black. A systolic murmur could be heard over the tumor. (See Figs. 1 and 2, A.) I was a good deal afraid that rupture might occur then and there, and so without further investigation hurried the patient into the hospital.

There, within a few days, the tumor broke. No blood came out, but only some puriform material. On more careful questioning it appeared that the swelling first made its appearance seven years before, and in the course of a few months attained nearly its present size and characteristics. It was at that time announced by a physician to be an aneurism of the aorta, but under treatment by iodide of potassium (internally) it diminished rapidly in size until no external tumor was visible. The

FIG. 1.



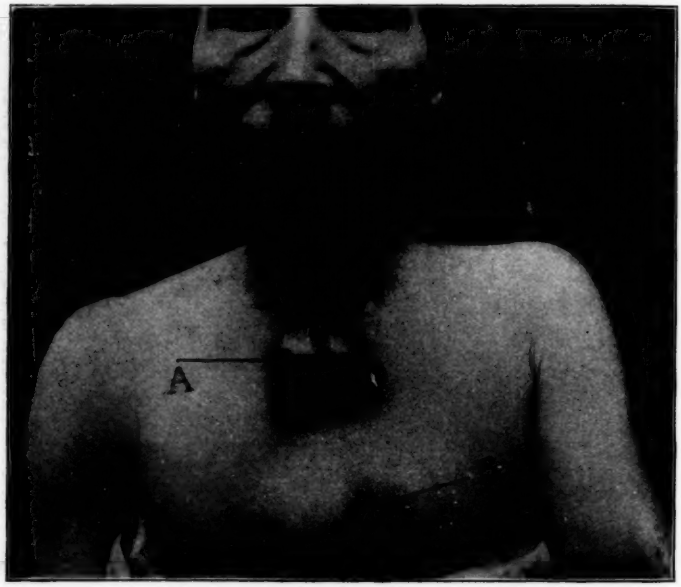
Tumor before rupture. B indicates the position of the lower swelling.

patient had always enjoyed good health, but had a series of seven successive miscarriages. Except for this there was nothing suggestive of syphilis in her history. The miscarriages occurred at intervals of from one to three months after conception. The first appearance of the tumor was attributed by the patient to a strain due to cornet playing. In the course of the last seven years *the tumor has come and gone several times*, becoming more noticeable during periods of hard work, and its disappearance occurring usually while she was taking potassic iodide. Her general health has always remained good. There has been no pain about the tumor or elsewhere, no dyspnœa, dysphagia, cough, or other pressure symptoms. Her appetite has never failed.

Physical Examination. A rather small, spare, sallow woman, bright and intelligent mentally. Over the manubrium in the middle line was a tumor the size of a lemon, shaped like the stump of a cow's horn, projecting about two inches above the sternum, the point directed somewhat to the right. The apex of the tumor was black and gangrenous-looking, with a deep red ring around it, shading to lighter red at the base, whence there radiated across the chest many highly-colored, dilated venules.

The tumor was soft and elastic in consistency, and pulsated with every heart beat, the pulsation being slightly expansile and causing the apex

FIG. 2.



Tumor before rupture. B indicates the position of a second swelling lower down.

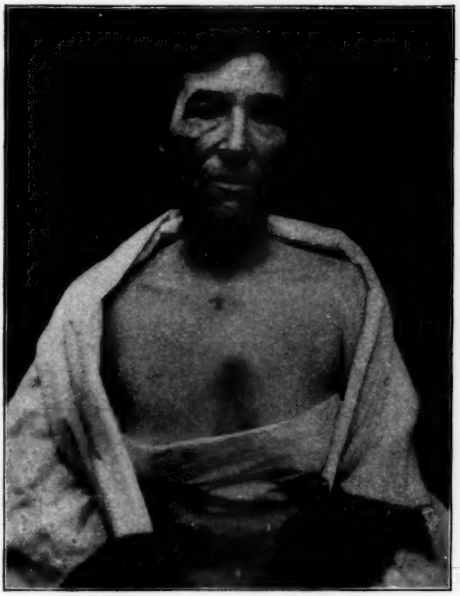
of the tumor to rock slightly from side to side. A soft, blowing, systolic murmur was audible everywhere over it.

Below this tumor and at the level of the third and fourth costal cartilages was a second pulsating mass, larger, flatter, and less inflamed than the other. This mass was also in the median line and covered the sternum over an area as large as the palm of the hand. (See Figs. 1 and 2, B.) This second mass was not elevated more than one-half an inch above the surface, and was only slightly red; nowhere gangrenous. It rose and fell with each beat of the heart, but was not apparently expansile. Its consistency was about the same as that of the upper mass. No murmur was heard over it, but the heart sounds were transmitted.

The heart's apex was in the fifth interspace, nipple line. At the base, around as well as over the tumor first described, was a soft systolic murmur, heard best over the pulmonary valve, and but faintly at the apex. Second sounds normal.

Radial pulses equal and synchronous; no tracheal tug; pupils equal and react normally; no unilateral flush or sweating. Voice natural. Lungs and abdominal organs negative; no glandular enlargement; reflexes normal. Scattered over the back and to a less extent on the chest and arms are many small white scars, due, the patient says, to chicken-pox. Larger scars on the front of both thighs following "boils."

FIG. 3.



Appearance after rupture of the tumor.

Temperature 98°, pulse 80, respiration 27.

Patient entered the hospital in the service of Dr. E. G. Cutler, who made the diagnosis of gummata of the sternum, and gave potassic iodide, gr. 90 per day. On the third day the upper tumor broke and a small quantity of bloody puriform material escaped, reducing the size of the mass at least one-third. The patient was transferred to the service of Dr. J. W. Elliot, and eleven days after the day when I first saw her the lower swelling was opened without ether, and material like that from the upper mass was evacuated. A week after this the patient went to the Waverly Convalescent Home, feeling very well, having

gained twelve pounds during her stay at the hospital. She was evidently half-starved before entrance.

After a fortnight at Waverly she reported to me at the out-patient department, looking well and bright. The appearance of her chest at this time—a month from the time I first saw her—is shown in Fig. 3. There was *no prominence* at the site of either tumor. One inch below the sternal notch in the median line was the opening of a small sinus which the probe, manipulated by Dr. C. A. Porter, entered for a distance of nearly three inches, the direction being mostly downward parallel to the anterior surface of the sternum. The point of the probe when in this position could not be felt from the outside, and this, together with the fact that the probe passed first backward toward the spine and then downward parallel to the sternum, convinced Dr. Porter that his probe had passed entirely through an opening in the bone and was in a sinus behind it. At the bottom of the lower opening near the ensiform rough bone could be felt with the probe. Dr. W. W. Gannett saw her at my request soon after this, and agreed with Dr. Cutler that there was no aneurism present. (An X-ray picture was taken at my request. Of this I shall speak later.)

I saw the patient several times in August, and found her always doing well and at work, though a small sinus persisted over the point where the upper tumor had been, and the fluid in this sinus could be seen to rise and fall with every heart beat. She dressed this sinus at home with sterile dressings, for which she came to the hospital now and then.

On Saturday, September 9th, she reported at the out-patient department, and, as I was then in Puerto Rico, she saw Dr. A. K. Stone, who found her to be doing well, and encouraged her as to her future, but she says that during September she noticed a sound described as like water falling drop by drop on a tin roof. The sound seemed to come from the region of the sinus in the sternum, and her husband states that it could sometimes be heard twelve feet away.

On the evening of September 15th she seemed very well and bright (her husband says) and went to bed feeling as usual. At midnight she got up and took up a pitcher of water, probably for a drink. There was the sound of a gush and a cry. The husband jumped up, lighted a match, and found her dead in a pool of blood issuing from her chest. There was no autopsy.

The remarkable points about this case are:

1. That the aneurism eroded and perforated the sternum in two places without ever causing pain or any other pressure symptoms.

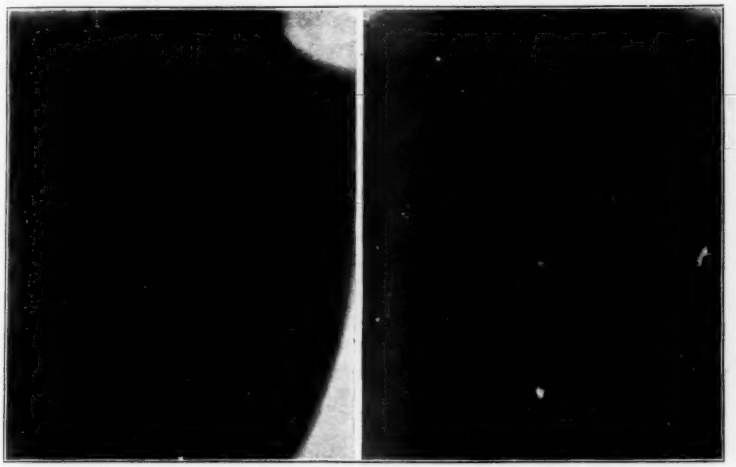
2. That it presented externally as a tumor, and then disappeared under treatment by iodide of potassium, the skin rupturing without letting out any blood. This series of events was repeated several times in the course of seven years.

I do not see how the diagnosis of aneurism can be in doubt in view of the termination of the case. Whether the process going on in the sternum may have been partly gummatous and partly due to the pressure of the aneurism, and exactly what was the cheesy material which was discharged during her stay in the hospital, I do not know. The

probe showed that the hole through the sternum was a comparatively small one, not nearly as large as the base of the tumor which presented over it. I suppose that at times the clot inside the sac was sufficiently firm to prevent the blood from forcing its way out through the perforated sternum, while at other times the blood would ooze through it and clot outside the sternum, so as to form the external tumor which was present when I first saw her.

The accompanying radiographs (Fig. 4) should have prevented the mistake in diagnosis. But I am ashamed to say that none of those who saw her took a sufficiently intelligent interest in them to see their significance until it was too late.

FIG. 4.



Radiographs.

We looked at them solely for evidence as to perforation of the sternum. Finding no gap in the sternum shadow, the false inference was drawn that no such perforation was present. But we should have known that the position of the spinal column is such that perforations of the sternum even of considerable size do not show on a radiographic plate.

It is perfectly easy now to see that there is a tumor in the region of the aortic arch (see Fig. 4, A), and to distinguish the heart (B) and the liver (C) below. But, somehow, this did not force itself upon us at that time. The moral obviously is that we should know more about the interpretation of radiographic plates.

AN EXPERIMENT IN THE TRANSMISSION OF SYPHILIS TO CALVES.[1]

By Mazyck P. Ravenel, M.D.,
BACTERIOLOGIST TO THE STATE LIVE-STOCK SANITARY BOARD OF PENNSYLVANIA; LECTURER ON BACTERIOLOGY, VETERINARY DEPARTMENT, UNIVERSITY OF PENNSYLVANIA.

(*From the Laboratory of the State Live-stock Sanitary Board.*)

That syphilis is a disease peculiar to man and incapable of transmission to the lower animals is generally accepted by the medical profession, and upon such firm ground does this opinion appear to stand that most text-books make the statement without going into the details of the experiments on which it is based. Apart from the scientific interest which the subject bears, there is a practical importance attaching to it which must hold our attention, owing to the fact that the opponents of vaccination against smallpox lay great stress on the alleged danger of transmitting syphilis by vaccination, some of them even going so far as to claim that syphilis and vaccinia are one and the same disease. The agitation against vaccination in our own city and State during the year just closed, and the assertions made by certain doctors before a legislative committee of the dangers involved in the practice, must be fresh in the minds of all. It was this agitation that suggested to Dr. Leonard Pearson and myself the advisability of repeating once more the attempt to produce syphilis in calves by inoculation from man.

In looking over the record of experiments on this subject I have been unable to find any report of the successful inoculation of bovines, failure having resulted in every instance of which I have knowledge, though there are experimenters who have claimed success in inoculating rabbits, guinea-pigs, cats, dogs, horses, pigs, and monkeys—a fact which is somewhat significant.

The scope of this paper does not permit me to go into a critical review of past experiments, nor, indeed, do I think it necessary. I have been impressed, however, by the fact that several of those who have claimed success have employed material from soft chancres, while others have used tuberculous matter, as suggested by Striker, who examined the supposed syphilitic nodules induced by Hansell, and also by Kaposi in regard to the same work.

The admirable work of Dr. Ernesto Duplan, done in the pathological laboratory of the University of Pennsylvania, and detailed in his graduation thesis (1884), deserves mention. He made seventy inoculations, using fifteen rabbits, five dogs, four guinea-pigs, and four apes, which he imported from Mexico himself for the purpose. His results were all

[1] Read before the Pathological Society of Philadelphia, February 8, 1900.

negative, with the exception of two rabbits inoculated with pus from a soft chancre. In these an indurated lump formed at the point of inoculation, which opened spontaneously on the twelfth and thirteenth days respectively, discharging thick, cheesy pus. With this pus four rabbits were inoculated, one of which died of tuberculosis at the end of four weeks, the others showing no ill effect. Although he cites these two cases as examples of successful transmission of syphilis to rabbits, I think it is clear that he was dealing with tuberculosis.

Among the lower animals there is only one disease known that bears any resemblance to syphilis—dourine or maladie du coit—sometimes called also syphilis of solipedes. This remarkable and interesting disease has been known for more than a hundred years, and is supposed by some to have had its origin in the coitus of syphilitic Arabs with she-asses. There is, however, absolutely no evidence of this, it being wholly theory, while on the contrary all attempts to produce dourine in mares and she-asses by infection with syphilitic virus have failed completely. Furthermore, the specifics against syphilis—mercury and iodide of potash—have no effect in dourine. The disease has been seen only twice in the United States, both times in imported stallions. It has been carefully studied in Europe, notably by the able veterinarians of the Alfort school, so that it is possible to affirm with certainty that dourine and syphilis are two entirely distinct diseases.

For our experiment two calves were selected, one a heifer, about eight months old, the other a bull, about fourteen months old, both in good condition, though the heifer was known to be tuberculous. Both had been on our premises and under observation for some months. The method of inoculation chosen was that practised by some of our best vaccine producers. The area selected was shaved, washed thoroughly with soap and water, and well rinsed with sterile water, after which a surface about the size of a silver half-dollar was scraped with a sharp scalpel until a slightly bloody serum began to exude. It was next scarified with the ordinary scarifier used in vaccination, in two directions at right angles to each other, and into this the syphilitic material was rubbed for not less than five minutes. A second scarification was then done, and the animals kept down until the surface had dried. The heifer (Ref. No. 26107) was inoculated in two places, on the inner side of the hind leg high up and on the abdomen just anterior to the udder, while the bull (Ref. No. 26130) was inoculated only on the inner side of the hind leg.

The material used was obtained through the kindness of a physician from a patient in the venereal ward of a hospital with which he is connected, and consisted of scrapings from a mucous patch on the lip and a sore about the genitals. The case was in the early secondary stage and the material taken at the commencement of treatment. It was collected at 11.30 A.M., and the inoculations made at 2 P.M. the same day.

On the next day the scarified areas were covered with a thin scab, and were surrounded by a narrow zone of slight redness, which disappeared during the next thirty-six hours. By the fifth day the scabs

had loosened at the edges and dropped off on the ninth day. At no time was there any appreciable amount of inflammation or swelling, nor did the animals show any discomfort. The temperatures were taken soon after the inoculation, and twice daily for fifteen days, as given below:

RECORD OF TEMPERATURE.

Calf No. 26107.			Calf No. 26130.		
Date.	A. M.	P. M.	Date.	A. M.	P. M.
August 12 . .	....	102.6	August 12 . .	....	103.6
" 13 . .	102.2	104.2	" 13 . .	102.6	104 2
" 14 . .	102	102.3	" 14 . .	102 8	102.2
" 15 . .	102.4	102 6	" 15 . .	101.6	101
" 16 . .	102	102	" 16 . .	102 4	102
" 17 . .	101	102	" 17 . .	101.2	102.4
" 18 . .	101 2	101.2	" 18 . .	102	101.4
" 19 . .	101.3	102	" 19 . .	101.2	101 2
" 20 . .	101	102	" 20 . .	102.2	102.2
" 21 . .	101.2	102	" 21 . .	102	102
" 22 . .	102	102	" 22 . .	102	102.2
" 23 . .	102	102	" 23 . .	101.8	102
" 24 . .	101.4	101.8	" 24 . .	102	102
" 25 . .	101.6	102	" 25 . .	101.4	101.8
" 26 . .	102	101.8	" 26 . .	101.6	101.4
" 27 . .	102	102	" 27 . .	101.6	102

Calf No. 26107 was kept under observation until October 5th, fifty-four days after inoculation, when it was killed. It was impossible to detect the points of inoculation, nor could any lesions be found in any part of the body which were in the least suggestive of syphilis. The animal was known to have tuberculosis, which the examination showed to be very limited, confined to a few nodules in the lung. A portion of the sciatic nerve, taken from the region of inoculation, and a section of the dorsal spinal cord were sent to the Pepper Clinical Laboratory, where they were examined by Dr. McCarthy, whose report is as follows:

"The examination of the central nervous system and the peripheral nerves of the calf No. 26107, inoculated with syphilis and sent to me by you, revealed no changes either by the Marchi osmic acid method, the Nissl cell stain, or the Weigert sheath stain. The peripheral nerves teased and stained by osmic acid were likewise normal.

"D. J. MCCARTHY."

Calf No. 26130 was kept under observation until December 28th, one hundred and thirty-eight days, when it was killed. A few days before it had been tested with tuberculin and found to react. In this animal, as in the other, it was impossible to detect the point of inoculation, nor could any change in the skin be detected after removal. The organs were entirely normal with the exception of one lung, which contained a cheesy tubercular nodule three-fourths of an inch in diameter. Dr. McCarthy's report on the nerves and spinal cord is as follows:

"An examination of the central nervous system and peripheral nerves of calf No. 26130, inoculated with syphilis, gave negative results

with the fresh osmic acid method, Marchi method, Weigert and Nissl stains. The specimens were perfectly normal. D. J. McCarthy."

The result of these two experiments, which were conducted with the greatest care, has been entirely confirmatory of the work of those observers who, like Neumann, have failed in all attempts to transmit syphilis to the lower animals, and who hold it to be impossible.

I apprehend that some may object to the value of these experiments, on the ground that the animals were both tuberculous, a fact which did not escape my attention. In man the two diseases are not rarely met with coexisting in the same individual, and the presence of tuberculosis appears to make the patient more susceptible to syphilis. Says Landouzy: "In this association syphilis finds the subject without resistance, and, furthermore, affording no hold to specific medication. . . . The worst morbid association that I know is the union of a pulmonary tuberculosis with a commencing syphilis (*Congrès pour l'étude de la Tuberculose*, 1891, p. 185)."

In closing I wish to make acknowledgment of the efficient services of my assistant, Mr. S. H. Gilliland, in the carrying out of this experiment, and of my indebtedness to Dr. D. J. McCarthy for his examination of the nerves and spinal cord.

GUMMA OF THE IRIS AND CILIARY BODY. RECOVERY WITH NORMAL VISION.[1]

By Charles A. Oliver, A.M., M.D.,

ATTENDING SURGEON TO WILLS EYE HOSPITAL; OPHTHALMIC SURGEON TO THE PHILADELPHIA HOSPITAL, PHILADELPHIA.

On November 20, 1895, a private patient, C. C. E., a thirty-seven year-old book-keeper (a self-proclaimed syphilitic), applied to me with the history that six years previously the left eye had become primarily inflamed, the sight of the eye being permanently lost in a few weeks' time. At that time he had placed himself under the care of several physicians, who had given him both local and general treatment—one doing an iridectomy.

He came complaining that the vision of the right eye, which was good until two weeks before I saw him, had become very much impaired, and that the eye was painful and somewhat inflamed.

Examination showed that the cornea of the left eye was distorted, and the iris-crypts were thickened. There was a dense, false cataract with calcareous areas on the anterior capsule of the lens. Numerous old, quite firm and unbreakable synechiæ surrounding a small, irregular pupil, in which there was imperfect superiorly situated coloboma, were plainly visible. The globe was soft and there was some ciliary and tarsal congestion. Vision was reduced to mere perception of light in a

[1] Read before the November, 1899, meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia.

small concentric field of about twenty degrees around the fixation-point.

The right eye gave evidences of a commencing irido-cyclitis. The anterior chamber was deepened, and the iris-plane was markedly indrawn. Intraocular tension was subnormal. The crystalline lens was slightly swollen and somewhat hazy. Vision, which was one-tenth of normal, could be brought to one-half acuity by the aid of a minus spherical lens of three diopters' strength. Atropine and hot stupes locally, bidaily, with inunctions of mercury, were ordered.

In three days' time intraocular tension in the right eye had become normal. The pupil was fairly well dilated, and there were but two or three fine synechiæ situated at its temporal border. The crystalline lens remained hazed and the iris was still indrawn. Corrected vision with the aid of the following lens combination (—S. 3, D. ○ —C. 0.75 D. ax. 90°) had fallen to one-fifth of normal. The fields of vision for white, red, and green were concentrically diminished to about one-half of their ordinary size; no scotomata could be determined.

The case being urgent and one that demanded constant treatment, while the financial condition of the patient was such that he was unable to have this done, I had him admitted into the wards of Wills Eye Hospital, the treatment as previously laid down being continued.

In two days' time a well-marked swelling in the upper outer ciliary region appeared, the mass evidently being situated beneath the scleral coat. With it there was associated a similar though much smaller swelling in the iris tissue at a corresponding point in the region of the major circle. Vision continued about the same.

In spite of a pronounced ptyalism, Dr. William F. Norris (to whom I showed the case in consultation) and I agreed upon increasing the mercurial inunctions to three drachms daily, using a mouth wash of listerine. The local treatment of atropine (to which was added scopolamine) and constant hot stupes was continued.

Two days later the scleral swelling was found to be slightly lessened, while the gummous mass in the iris had broken and discharged its contents into the aqueous humor, giving an appearance as seen in so-called gelatinous iritis. The pupil was dilated to five by six millimetres, its long axis being at seventy-five degrees. There remained but one small synechia in its upper outer part. The crystalline lens haze had lessened to a sufficient degree to make it evident that the vitreous humor was permeated with a thickened and a slightly translucent material, through which the fundus of the eyeball could be distinctly seen. Vision was reduced to one-sixtieth of normal, while small areas of red and green placed in the still reduced visual field could be distinguished only with the greatest difficulty. Treatment was continued.

Gradually during the next two weeks' time vision increased to five-thirtieths of normal, the fundus details being still faintly visible through a great number of coarse fresh vitreous opacities. The gummous discharge into the anterior chamber had disappeared.

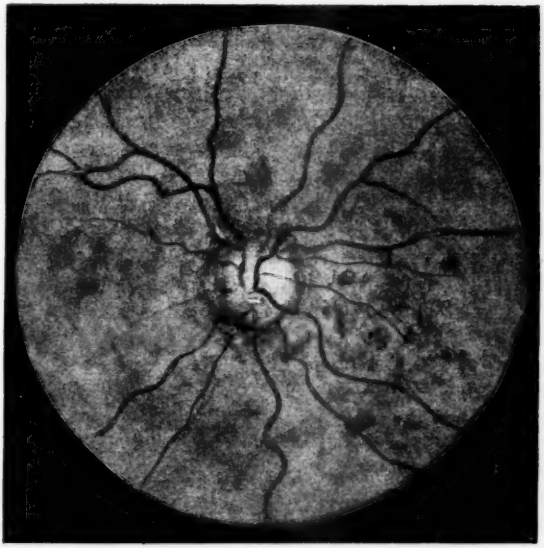
The patient remained in the hospital practically under the same treatment for three weeks longer. His vision at this time equalled one-sixth of normal, this being obtained by the correction of a compound hypermetropic astigmatism of about two diopters' strength. He was then discharged as an out patient.

One month later the eye-grounds could be plainly seen. The iris was mobile, and, with the exception of a quite pronounced descemetitis

and a few remaining vitreous opacities, the media were clear. No trace of the ciliary swelling could be seen, while that portion of the tissue of the iris which had been previously infiltrated and the most affected had become degenerate and steel-gray in color in contrast with the rest of the membrane, which was fairly healthy in condition and light-blue in tint.

Except for two slight attacks of similar conditions, in which vision was reduced to one-fortieth of normal, during the months of March and June of 1896, lasting but a few days each, there was not any return of the gross symptoms up to the middle of the year 1897, when the patient was seen for the last time.

During the summer of 1896, immediately after the second exacerbation, a few small transparent blebs that were superficially seated appeared in the right cornea immediately opposite the pupillary area. These, however, subsided in a few days' time, and never recurred while the case was under observation. When the patient was last seen the vitreous opacities were almost entirely cleared away and corrected vision was nearly normal.



Ophthalmoscopic appearances of neuroretinitis from uveitis.

The fields of vision of the saved eye were never greatly disturbed, suffering slight concentric contractions only during the inflammatory exacerbations.

The eye-ground never presented any gross pigment changes and depositions as are so frequently seen in many cases of low-grade choroidal inflammations. The most unusual condition of the fundus (neuroretinitis from uveitis), as found between two of the exacerbations, can be seen

in the accompanying sketch, which was made for me on May 18, 1896, by Miss Margaretta Washington, of this city.

REMARKS. For several reasons the case is interesting: The remarkable condition found in the fellow-eye, which most probably had suffered from a similar type of affection; the recovery of the organ with normal vision after three severe exacerbations; the endurance and positive value of large doses of mercury; the comfort obtained by the local use of heat, mydriatics, and cyclopegics; the discharge of the gummous material into the ocular media, with the rapid disappearance of the mass; the temporary change of refraction from farsightedness and astigmatism to nearsightedness and astigmatism; and the appearance and retention of the most curious ophthalmoscopic picture of chorioretinal disturbance.

THE VALUE OF ELECTROLYTIC DILATATION OF THE EUSTACHIAN TUBES IN CHRONIC TUBAL CATARRH AND CHRONIC CATARRHAL OTITIS MEDIA.[1]

BY ARTHUR B. DUEL, M.D.,

AURAL ASSISTANT SURGEON TO THE NEW YORK EYE AND EAR INFIRMARY; ASSISTANT SURGEON (NOSE AND THROAT DEPARTMENT) TO THE MANHATTAN EYE AND EAR HOSPITAL; CONSULTING AURAL SURGEON TO THE WILLARD-PARKER AND RIVERSIDE HOSPITALS.

A STUDY of the literature of the past decade shows a remarkable change in the attitude of otologists toward chronic catarrhal otitis media. This change has been due not so much to any added knowledge regarding the pathology of the condition as to the method of treating it.

Not many years have elapsed since the patient suffering from this form of deafness was dismissed, often after the first examination, certainly after a short course of ineffectual treatment, with the cheerless assurance that the disease was irremediable; that he might go on for a considerable period without any serious advance of the trouble, but that it would probably grow steadily worse.

This was the prognosis given by the conscientious surgeon, who felt that he had no moral right to continue with the treatment then in vogue after failing to give any relief within a given time. The despairing patient, casting about for some ray of hope, sought in turn the advice of one specialist after another, usually meeting with the same dismal prognosis, until finally he was gathered in by some charlatan, who promised much, but accomplished little or nothing in the way of improvement other than the mental relief afforded by the thought that something was being done.

In more recent years, however, the keener appreciation on the part of otologists of the importance of nasal and nasopharyngeal obstruction

[1] Read before the American Laryngological, Rhinological, and Otological Society, Cincinnati, June 4, 1899, and in part before the Harvard Medical Society of New York, January 6, 1900

and inflammation in the production of deafness, the improved methods of removal of these exciting causes, and, lastly, the well-grounded conviction that it is worth while, by persistent, painstaking effort, to arrest the advance of this condition, even if no brilliant improvement takes place, have accomplished much for the relief of sufferers with chronic tubal catarrh and chronic catarrhal otitis media.

The dividing line between these affections is difficult to define, and, indeed, the determining cause usually being the same, the distinction is largely one of convenience. While it is possible that a chronic aural catarrh may begin in the tympanum, with no very marked evidence of any nasopharyngeal or tubal catarrh, it is usually the case that the tubal catarrh precedes or accompanies the tympanic inflammation. It is probably true in the majority of cases that the more serious inflammatory hyperplasia of connective tissue takes place first in the narrow Eustachian tubes, and that the hyperæmia of the tympanum is at first often mechanical or functional, due to the stagnation and consequent lowering of air pressure from lack of sufficient ventilation.

This functional hyperæmia, characterized by its deficiency in round cells, and the rapidity with which it is reabsorbed when the exciting cause (viz., the closure of the Eustachian tube or pressure on the plexus of veins which drains the tympanum) is removed, gradually changes to one of an inflammatory type in which there is an abundant pouring out of round cells which, by rapid proliferation and increase in size, form into an organized exudate. This inflammatory exudate and newly-formed connective tissue resulting from it, in contradistinction to the mechanical or functional exudate in a simple congestive hyperæmia, does not rapidly disappear when the exciting cause is removed (although its advance may thus be stopped), but has a tendency to further organize into connective tissue bands and cords which eventually, by a process of atrophy, bring about the sclerotic stage of chronic aural catarrh.

The writer does not by any means wish to be understood that he believes this to be the stereotyped process in every case of chronic catarrhal otitis media, realizing that in many cases the sclerotic process begins apparently from the start; but the number in which the tube is obstructed early in the course of the disease, and as a result is a chief contributing cause to the mischief done to tympanic structures, is sufficiently large to warrant the presentation of such a picture as a working hypothesis.

This view is largely supported by clinical experience where one finds in such a large majority of cases a marked temporary improvement in hearing following inflation, showing that the retracted membrana tympani and tympanic hyperæmia were largely functional, due to stagnation from Eustachian obstruction rather than to serious organic changes.

There is nothing new or novel in this view of the situation, and it is presented here as concisely as possible, merely as leading up to the

proposition that the most important point in the treatment of the conditions under consideration is the ventilation of the tympanum by the early establishment and constant maintenance of the patency of the Eustachian tube, thus eliminating one of the most potent causes of the organic changes to tympanic structures which interfere with their function. This has long been well understood, and, as was remarked at the outset, improved methods and more persistent painstaking efforts on the part of otologists have done much to change the results of treatment.

In the earlier stages of tubal obstruction, when the tissues are swollen and succulent from circulatory hyperæmia, the reduction of the swelling by the air douche is now largely accomplished by the use of the Eustachian catheter, accompanied by the diagnostic tube, for the purpose of determining exactly what is being done, rather than by the use of the more inaccurate Politzer bag and dependence on the statement of the patient as to whether or not the tympanum has been inflated.

Later on, when the inflammatory exudate has been poured out, much has been accomplished to hasten its reabsorption by inflation with stimulating vapors.

In the later stages, however, where the exudate has begun to organize into fibrous tissue, it has been found necessary to use bougies to overcome the obstruction. For this purpose bougies of whalebone, metal, and cotton have been constructed and used with marked success.

Lastly, these dilatations have been made by electrolysis, the metal bougie being made the negative pole of the galvanic current. It is for the purpose of calling attention again to the great usefulness of this procedure in the relief of Eustachian obstruction that this paper has been written.

Electrolysis for the purpose of dilating strictures was first made use of by Crussel in 1839, and was first employed systematically in 1867 by Mallez and Tripier, of Paris. In this country, Dr. Robert Newman, of New York, has made use of it, mainly in the treatment of urethral stricture, for more than twenty years, and, in the face of most bitter opposition, has demonstrated its great value.

It was due to a study of its use in this connection and an observation of its practical utility that the author was led to employ it in the dilatation of stricture of the Eustachian tube. After speaking with a number of prominent otologists, none of whom had known of its previous use in this way, the method was reported as new. A more careful investigation of the literature, however, shows that it was used in London by Mr. Cumberbatch and Dr. W. E. Steavenson in 1888. Seven cases are reported in the *Lancet* for November of that year. The cases all showed improvement, although at that time they had not been long under observation. In an article published in the *New York Medical Record* for December, 1898, Dr. Robert Newman mentions

having used the electric current some years ago, for the purpose of dilating strictures of the Eustachian tube, with good results.

Neither Steavenson nor Newman used a bougie which could be protruded for more than an inch from the tip of the catheter, and this, in the writer's mind, would be a cause of failure in securing a patent tube in a large number of cases, since the organized stricture is often found more than that distance from the pharyngeal opening.

The method devised by the writer, without any previous knowledge of the work done by the above-named gentlemen, has been published in detail in previous articles, and is now being practised with marked success by many prominent otologists.

A bougie which could be protruded from the tip of the catheter an inch and a half, or more if necessary, has been passed directly into the tympanum in every instance where it has been possible.

The bougies are made of gold, and correspond in size to Nos. 2, 3, and 4 of the French scale. The smaller sizes are usually used. It probably does not matter so much about the size as that the current should be kept in contact with the hyperplastic tissue long enough for the electrolytic action to take place. The bougie is drawn through a small pure silver catheter until the oval head fits snugly in the opening at the tip. The other end is connected one and one-half inch from the opening by a delicate handle with the negative pole of the battery.

The catheter, after being carefully bent so that it will fit accurately in the mouth of the Eustachian tube, is insulated by winding a narrow strip of rubber tissue spirally from tip to ring. This being renewed each time it is used, the catheter and bougie being boiled, cleanliness is insured.

In any case where the tube is to be bougied the nose and nasopharynx should be carefully cleansed with an alkaline antiseptic solution, such as Dobell's or Seiler's, and afterward thoroughly anæsthetized with a 10 per cent. solution of cocaine. The patient is connected with the positive pole of the battery by an ordinary contact electrode held in the hand. The negative pole is attached to the bougie as just described. The tube is bougied in the usual manner, the bougie being pushed along until it meets with a definite obstruction. Instead of forcing through this by heavy pressure the current is turned on up to from 1 to 3 m. amp., according to the sensation of the patient, and after twenty seconds to a minute the bougie usually will be felt to pass on through the softened stricture with a gentle pressure. At the same time the patient will usually hear "bubbles breaking in the ear." If the desired result is not obtained at the end of a minute or two, no greater pressure should be used, but more current-strength turned on.

It has been the writer's custom not to use more than five milliampères current-strength, nor a contact longer than five minutes at one sitting. This should be repeated at intervals of one week to one

month, being guided as to its frequency by the result indicated by inflation every other day. Usually two to four sittings will be sufficient.

The battery should have from thirty to fifty volts, and should be supplied with a good rheostat and milammeter.

It is with the hope that otologists who have not already done so may be convinced of its superiority and led to employ this method of dilating strictures of the Eustachan tube, that the writer calls their attention to the results of the past three years' work in Eustachian electrolysis.

Something over a year ago, through the friendly efforts of Dr. J. F. McKernon, a room at the New York Eye and Ear Infirmary was equipped for the purpose of systematically carrying on this work, and it is by his suggestion and through his courtesy that the writer has devoted the greater portion of his time in the infirmary for the past year in an attempt to fix the value of electrolytic dilatation of strictures of the Eustachian tube. During this time some fifty cases selected from Dr. McKernon's clinic have been bougied, a careful record of the results being kept. As many as these as have persisted for a sufficient length of time to make their record of any value, together with ten cases from Dr. Denich's clinic, reported about two and one-half years ago, and a number from the writer's private records (in all fifty cases), have here been tabulated for the convenience of those who wish to study them more carefully at their leisure.

To read them now would be tiresome, and I shall only recount briefly the history of the three typical cases and present for your consideration the conclusions arrived at from the experience gained in the treatment of the whole number.

Case I.—Dr. S., aged twenty-eight years, for six or eight months suffered from repeated attacks of tubal catarrh accompanied by deafness, pulsating tinnitus aurium, and a sense of pressure in the left ear. These attacks were relieved by attention to a chronic nasopharyngeal catarrh and inflations through the Eustachian catheter, first with air and later with vapor of iodine and menthol. In spite of constant efforts in this manner the intervals of relief grew shorter, until finally the tinnitus, deafness, and sense of pressure were constant, although at times much more prominent than at others. During this time there was evidence of a constantly narrowing calibre of the Eustachian tube. A No. 3 (French scale) bougie, attached to the negative pole of the galvanic current, was passed into the tube three-quarters of an inch, when it met with an obstruction. Two milliampères current-strength was turned on, and this gradually increased to 4 m. amp. With a slight pressure the bougie passed through a stricture one-quarter inch long, and then on into the tympanum without meeting any further obstruction. Inflations were kept up every day for the next week. There was a gradual increase in the amount of air which entered the tympanum on inflation. After the second day the tinnitus stopped entirely for about a week, when there was slight recurrence for two or three days, coming on intermittently. The tube was bougied again in the same manner. Inflations at intervals of two days for two weeks following showed the

tube to be freely opened. There was complete relief from the sense of pressure, no tinnitus whatever, and the hearing was perfect. Several weeks afterward, at the time of this writing, there has been no recurrence. Nothing other than careful attention to the nasopharyngeal catarrh has been done for more than a month.

CASE II.—R. D., aged nineteen years, history of deafness and marked tinnitus in right ear, and slight vertigo for several years. Functional test shows lower tone-limit 512 v. s.; whisper, six feet; acoumeter, three feet; bone conduction increased. Practically complete stenosis of right Eustachian tube. Attempted inflation fails to improve. For three months—from October, 1896, to January, 1897—the tube was bougied by this method eight times, at intervals varying from one week to one month, inflations being made in the intervals. During this time, practically from the day of the first bougie, there was no tinnitus or vertigo. The hearing distance came up from six feet for the whisper to twenty-five feet, and for the acoumeter from three feet to twenty-four feet. The patient said he heard ordinary conversation perfectly, and easily heard the tick of a clock fourteen feet away which he had formerly heard only on contact. The tube was freely opened on inflation. During the following nine months, instead of presenting himself for occasional inflation, he remained away. He then returned, saying that the hearing was getting worse again. This was found to be true, but on inflation the tube was found to be quite patent and the hearing distance gradually came up after a few inflations nearly to the former point. He was then lost sight of until October, 1898, two years from the time of the first bougie, when he again appeared, stating that he was getting worse. Inflation showed that the tube was still open, and was followed by an immediate improvement in hearing again.

CASE III.—Mrs. V., a singer of considerable prominence, had been growing gradually deafer for fifteen years up to May, 1898, despite the fact that she had been under treatment by many distinguished otologists. At that time she presented herself for treatment, stating that she was losing confidence in her ability to place tones properly, owing to the sensation that she was "singing in a barrel." There had been vertigo and tinnitus at intervals. The functional examination was as follows: Lower tone-limit: right, 512; left, 256; b. c. increased on both sides. Whisper: right, four inches; left, two feet. Acoumeter: right, one-half inch; left, one-half inch. Both tubes were constricted and both membrana tympani retracted.

Inflation improved the left but not the right. Both tubes were bougied twice at intervals of two or three weeks. Marked improvement followed. The tubes admitted air much better on inflation, and the hearing distance increased to two feet on the right side and six feet on the left side for whispers. The sensation of fulness in the head and inability properly to place tones in singing largely disappeared, and the hearing for conversation and all sounds improved. Inflations have been kept up for the past year about twice a week, with a rest of about four months during the patient's absence from town in hot weather, and about one month in winter. The tubes still remain open, and the tests show the same improvements first noted for the whisper and acoumeter. The lower tone limit has improved one octave on either side. The tinnitus and vertigo for the past year have been present much less frequently, appearing only on a few occasions, when the patient has suffered from cold in the head.

Tabulated Report of Fifty Cases.

Forks used in tests were Hartmann's series and Dench's, ranging from 26 to 64 v. s. (double).

No. of case.	Age	Sex	Duration of deafness.	Tinnitus.	Vertigo	Lower tone-limit, first test.	Bone conduction.	Whisper, first test.	Acoumeter, first test.	Situation of stricture in inches from pharyngeal opening of tube.	No. times bougied.	Period of time under observation.	Whisper, last test.	Acoumeter, last test.	Tinnitus, last note.	Vertigo, last note.	Condition of tubes at last test.
1	45	F.	2 mos.	2 mos.	Occasional.	R 512 L 30	+ +	30 feet 30 feet	1½ feet 1½ feet	½ inch ½ inch	4 3	8 mos.	30 feet+ 30 feet+	6 feet 4 feet	.....	.....	Freely open, fairly well open.
2	28	F.	7 mos.	7 mos. 7 mos.	No	R 64 L 128	N N	30 feet 30 feet	15 feet 6 feet	½ inch	1	2 wks.	.....	30 feet	.....	....	Open.
3	57	F.	1 year	1 year	Occasional.	L.....	.....	L 8 feet	.....	¾ inch	1	.....	.....	....	.....	.....	Did not return.
4	25	F.	3 mos.	1 year	No	R 30	+	30 feet+	30 feet+	¾ inch	1	3½ mos.	30 feet+	30 feet +	Gone	....	Open.
5	25	M.	5 years	5 years	"	R 64 L 64	— —	+	.....	½ inch	4	5 mos.	Greatly improved.	.....	Much diminished.	.....	"
6	47	F.	3½mos.	.....	Occasional.	R 64 L 64	....	3½ feet 6 feet	½ inch 1 inch	¼ inch 1 inch	4 3	11 mos.	Slightly improved.	.....	Much diminished.	.....	"
7	40	F.	7 years	.....	No	R 256 L 256	N N	1½ feet not at all.	1½ feet not at all	¼ & 1 in.	4	8½ mos.	Improved.	Improved.	Very much diminish'd.	.....	"
8	57	M	10 years	.....	"	R 512 L 512	N N	30 feet 30 feet	4 feet 4 feet	½ inch 1¼ inch	2 1	6 mos.	30 feet+ 30 feet+	18 feet 16 feet	Entirely gone.	.....	" "
9	21	M.	3 mos.	Yes	"	R 26 L 26	+ +	30 feet 30 feet	3 feet 3 feet	1¼ inch	5	10 mos.	30 feet+ 30 feet+	.....	Very much diminish'd.	Very much diminish'd.	"
10	16	F.	6 mos.	"	"	Gal. 45	.....	R 1 foot L 30 feet	1 foot 30 feet	½ inch	1	1 mo.	20 feet+	20 feet	Entirely gone.	Entirely gone.	"
11	48	F.	21 mos	"	.....	.....	.....	R 26 feet	W 14 in.	¼ & ½ in.	2	1 mo.	.....	W 24 in.	Stopped	.....	Fairly well open.
12	32	F.	4 mos.	"	No	.. ...	.....	R 8 feet L 24 feet	2 feet	¾ inch	2	1 mo.	30 feet+	11 feet	Stopped	.....	Open.
13	37	M.	6 mos.	"	"	R 40 L 128	.....	32 feet 4 feet	2½ feet ½ inch	½ & 1¼ in. 1½ inch	3 4	4 mos.	30 feet+ 30 feet+	6 feet 3 feet	Improved.	Improved.	Partly open.
14	23	F.	4 years	"	"	.....	.....	.....	.....	1 inch	3	6 mos.	....	.....	Not improved.	Not improved.	Open.
15	40	F.	20 years	1 year	"	R 256 L 32	.....	4 inches 30 feet	½ inch	¼ inch	2	4 mos.	24 inches	4 inches	Much improved.	Much improved.	"
16	53	M.	15 years	15 years	10 years	.....	.....	4 feet 10 feet	4 inches 2 feet	¼ inch ¾ inch	1	1 mo.	6 feet 12 feet	.....	Did not return for treatment.		

17	19	F.	2 mos.	Yes	No	.....	.....	.....	.....	L 1 inch	2	3 mos.	.....	.....	Stopped	Stopped	Open.
18	22	M.	7 mos.	"	Yes	R 26 L 26	N N	30 feet + 30 feet	30 feet + 30 feet +	1 inch	1	....	.....	.....	Entirely relieved.	Entirely relieved.	"
19	26	M.	5 mos.	"	No	R 256 L 26	+ N	3 feet 30 feet	3 inches 30 feet	⅛ inch	2	5 mos.	30 feet 30 feet	30 feet 30 feet	Entirely relieved.	Entirely relieved.	"
20	22	F.	2 years	"	"	R 128 L 512	+ +	4 in. cannot distinguish contact.	⅛ inch	⅛ inch 1 & 1½ in.	1 2	4 mos.	Much improved.	Much improved.	Relieved.	Relieved.	Partly opened.
21	34	F.	7 years	"	"	R 256 L 256	+ +	9 feet 15 feet	6 inch 10 inch	1 inch 1 inch	3 1	4 mos.	Much improved.	Much improved.	Relieved.	Relieved.	Only partially opened, strictures not passed; patient left.
22	30	F.	1½ yrs.	"	"	R 128 L 512	+ +	10 feet 4 feet	10 feet 4 feet	1 inch ¼ inch	1 3	1 year	30 feet 12 feet	16 feet 8 feet	Much relieved.	Much relieved.	Fairly open
23	48	F.	1 year	"	.....	.....	.....	.....	.....	L 1 inch	2	1 mo.	.....	.....	Stopped	Stopped	Open.
24	40	M.	4 years	"	No	512	—	2 feet	⅓ inch	⅛ & 1¼ in.	3	2 mos.	No improvement.	No improvement.	.....	.....	Fairly open
25	14	M.	2½ mos.	"	"	R 26 L 40	.....	26 feet 26 feet	26 feet 26 feet	1 & 1¼ in. ¼ inch	3 2	2 mos.	.....	.....	Stopped	Stopped	Open.
26	37	F.	7 mos.	"	"	R 512 L 512	— —	8 inches 8 inches	⅓ inch ⅓ inch	1 inch 1 inch	2 2	3 mos.	No improvement.	No improvement.	No improvement.	No improvement.	"
27	47	M.	5 years	"	"	.....	.....	R 10 in. L 8 in.	4 inches 8 inches	⅛ & 1¼ in. ¼ inch	3 4	2 mos.	Improved.	Improved.	Stopped	Stopped	Fairly open
28	38	M.	30 years	14 years	Yes	512 512	— —	4 feet 1 foot	2 feet 1 foot	1¼ inch 1 inch	2 2	8 mos.	No improvement.	No improvement.	Greatly diminished.	Greatly diminished.	Fairly open
29	16	F.	3 years	Yes	No	512 512	+ +	10 feet 6 feet	5 feet 3 feet	¾ inch ⅛ & 1¼ in.	1 1	1 mo.	Much improved.	10 feet 6 feet	Greatly diminished.	Greatly diminished.	Open.
30	54	M.	20 years 1 year	"	"	35 gal. 128	+ —	Not at all	Contact	Complete stenosis +2 inches 1 inch.	5 3	5 mos.	Marked improvement of hearing.	Marked improvement of hearing.	Marked improvement of bearing.	Marked improvement of hearing.	Fairly open
31	43	M.	9 mos.	"	"	64 32	— N	1 feet 27 feet	1 inch 4 inches	⅛ & 1½ in.	2	1 mo.	Slight improvement.	Slight improvement.	Slight improvement.	Slight improvement.	Open.
32	20	F.	5 years	"	"	256 256	....	15 feet 15 feet	6 inches 6 inches	¼ inch 1 inch	3 2	10 mos.	20 feet 20 feet	10 feet 12 feet	Diminish'd	Diminish'd	"
33	37	M.	10 years	"	Yes	128 1024	— N	30 feet 4 feet	3 feet Contact	¾ inch ⅓ inch	1 1	1 mo.	30 feet + 24 feet	30 feet + 11 feet	Diminish'd	Stopped	"
34	27	M.	5 mos.	"	"	.....	.....	.....	.....	1 inch	2	2 mos.	Improved.	.....	Stopped	Stopped	Fairly open
35	...	M.	6 years	"	"	40	N	30 feet	30 feet	.....	1	1 mo.	30 feet	8 feet	Diminish'd	.....	Open.
36	54	F.	2 years	"	"	128 512 40	+ +	20 feet 30 feet 3 feet	2 feet 30 feet 1 inch	1 inch	1	1 mo.	10 feet	6 inches	Improved.	Improved.	"

No. of case.	Age	Sex	Duration of deafness.	Tinnitus.	Vertigo	Lower tone-limit, first test.	Bone conduction.	Whisper, first test.	Acoumeter, first test.	Situation of stricture in inches from pharyngeal opening of tube.	No. times bougied.	Period of time under observation.	Whisper, last test.	Acoumeter, last test.	Tinnitus, last note.	Vertigo, last note.	Condition of tubes at last test.
37	41	M.	10 years	Yes	No	128 512	+ —	2 feet 2 inches	2 inches ½ inch	½ inch	2	3 mos.	Improved.	18 inches	Not improved.	Not improved.	Open.
38	59	M.	10 years	"	Yes	.....	.....	L 6 feet	.....	1 inch	1	.....	15 feet	.....	Much improved.	Much improved.	Still very narrow.
39	51	M.	4 mos.	"	No	128 64	.....	4 feet 20 feet	½ inch 3 feet	1 inch	2	1 mo.	24 feet	6 feet	Stopped	Stopped	Open.
40	34	M.	12 years	"	"	.....	.....	.....	.....	1 inch 1 inch	3 3	1 mo.	.....	.....	Very much diminish'd.	Very much diminished	"
41	42	F.	15 years	"	Yes	512 256	+ +	4 inches 2 feet	⅛ inch ⅛ inch	⅛ inch ¼ inch	2 2	1 year	2 feet 6 feet	6 inches 1 foot	Improved.	Improved.	"
42	19	M.	5 years	"	"	512 128	+	6 feet	3 feet	⅛ inch	8	2½ yrs.	25 feet	24 feet	Much improved.	Much improved.	"
43	66	M.	15 years	"	No	256 26	N N	20 feet 20 feet	2½ feet 2½ feet	⅛ inch 1¼ inch	3 3	1 year	30 feet 30 feet	4 feet 5 feet	Much improved.	Much improved.	"
44	48	M.	1 year	"	"	256 256	N N	3 feet 3 feet	1 inch 1 inch	¾ inch ⅛ & 1¼ in.	2 3	3 mos.	Much improved.	Much improved.	Improved.	Improved.	"
45	50	M.	5 years	"	"	128 128	— —	.....	.....	1 inch 1 inch	1 1	1 mo.	No improvement.	No improvement.	No improvement.	No improvement.	"
46	39	M.	10 years	"	Yes	128 1024	.....	30 feet 4 feet	3 feet Contact	½ inch 1 inch	1 1	1 mo.	.....	11 feet 1 foot	Diminish'd	Stopped	"
47	45	M	15 years	"	No	26 26	N N	20 feet	8 feet	1 inch	3	1 year	30 feet	24 feet	Stopped	Stopped	"
48	66	M.	15 years	"	"	256 26	N N	20 feet+ 20 feet+	2½ feet 4 feet	⅛ inch ¼ inch	3 3	1½ yr.	30 feet+ 30 feet+	6 feet 10 feet	Improved.	.....	Fairly open
49	60	M.	5 years	"	Yes	.....	N	.....	....	.....	1	.....	.....	.....	Stopped	.....	Open.
50	48	M.	1 year	"	No	256 256	N N	3 feet 3 feet	1 inch 1 inch	1 inch ⅛ inch	3 2	4 mos.	4 feet 4 feet	Improved.	Stopped	.....	"

The following conclusions are presented for consideration: 1. The pathological process in inflammatory conditions of the Eustachian tube and the tympanum is the same—*i. e.*, hyperæmia, followed by the exudation of round cells, which organize into new connective tissue, and subsequently atrophy. 2. The names chronic tubal catarrh and chronic catarrhal otitis media, then, should suggest only a difference in position of the inflammation and not in its character. 3. Where the affection is confined to the tube the impairment of hearing is functional, and is restored as soon as the normal patency of the tube is effected. This is true, also, of tinnitus and vertigo. 4. Tubal obstruction is present early in a very large percentage of all cases of chronic hypertrophic catarrhal otitis media, and in such instances is one of the chief contributing causes to the further advancement of the disease within the tympanum. 5. It is our duty, then, wherever there is a stenosis of the Eustachian tube to remove the obstruction as rapidly as possible. 6. In every instance where the obstruction is due to an organized exudate the best method for its removal is electrolysis, for the following reasons: (*a*) It is more rapid. In several instances one application of the electrolytic bougie has been sufficient to cause the reabsorption of the deposit, and in the majority of cases only a few applications have been necessary to secure a patent tube. (*b*) It is more efficient. The disappearance of the exudate results from electrolytic action and not by mere pressure, as in other methods of dilating strictures, and consequently requires less force. There is, therefore, less danger of traumatism. The electrolytic bougie has been easily passed through strictures which were so firmly organized that it was impossible to pass a cotton bougie. (*c*) The results are more permanent. A stricture once removed by this method is permanently removed. The primary cause, acting again, may bring about its reappearance, but by careful attention to proper treatment a large percentage of the tubes may be kept patent. 7. The removal of obstructions in the Eustachian tube is only a large factor in and not the whole treatment of chronic tubal catarrh and chronic catarrhal otitis media. 8. The prognosis in any given case depends largely upon the amount of injury to tympanic structure. Where inflation is followed by marked temporary relief of deafness, subjective sounds or vertigo, one may expect brilliant results from the establishment of the patency of tubes. Where no temporary improvement follows inflation much may be accomplished, although the results are by no means so certain. The narrow tube should be opened, nevertheless, in every instance, with the hope of checking the advance of the disease. In a word, then, the writer wishes to make the points that (1) all narrow tubes should be restored to their normal calibre; and (2) where the narrowing is due to an organized inflammatory exudate, the best means of accomplishing this is by electrolysis.

A CRITICAL SUMMARY OF RECENT LITERATURE

ON THE

LOCALIZATION, DIAGNOSIS, PROGNOSIS, AND TREATMENT OF GONORRHŒA IN WOMEN.

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(Continued from page 81, January, 1900.)

Localization. In their descriptions of the various localities which may become affected, Bumm and Klein in their monographs take up first the consideration of gonorrhœa of the urethra. The infection of this organ is so frequent that it may be considered almost without exception to be a characteristic of all acute cases. Bumm calls attention to the fact that the gynecologist seldom sees the cases of acute infection, because, as a rule, they consult the family physician or attend special genito-urinary dispensaries, or, as is frequently the case, let the process run on without treatment until the urethral gonorrhœa has disappeared and symptoms indicative of localization in the uterus or appendages arise. The gynecologist, therefore, as a rule, sees these cases in their later rather than in the acute stage.

One of the first signs in urethral gonorrhœa is a serous, transparent, yellowish secretion which at first contains only a few pus but many epithelial cells. Many of these epithelial cells are collected together in masses and between them many colonies of gonococci are seen. As a result of this desquamation of the epithelium the orifice of the urethra becomes reddened and often very œdematous, and the swollen mucous membrane frequently appears as an ectropion, from which a drop of greenish-yellow pus may be expressed.

The extension of the inflammation upward is, as a rule, rapid, and from day to day its progress may be determined by digital pressure upon the urethra and base of the bladder which elicits considerable pain. In the first days of the attack only the external portion gives rise to pain, later by digital expression a large quantity of yellowish, blood-tinged pus may be discharged.

As a rule, the symptoms in simply urethral gonorrhœa are at most very slight and fleeting in their character. In general, these patients complain of an unusual tendency to urination, and a feeling of irritation during and after this act. Urination is usually accompanied

with excessive burning, especially when the surrounding epidermal areas are acutely inflamed by the irritating effect of the purulent discharge. All of these symptoms usually disappear quickly, and within three or four weeks, and frequently earlier, the mucous membrane returns to its normal appearance and the purulent secretion ceases.

According to Bumm, within six to ten weeks from the appearance of the acute attack the process has entirely healed itself. While the general tendency in these cases is to a complete healing, there are, nevertheless, cases in which the infection becomes chronic, and, notwithstanding the application of every remedy, persists for years. Such cases may easily be overlooked, because the symptoms are usually obscure.

Notwithstanding the apparent complete disappearance of the infection, the process may still be sufficiently active to transmit a virulent infection. On minute examination of these cases papillary excrescences of bright-red or grayish-red color may be detected. In the furrows between these caruncles the mucous membrane may be eroded and covered with pus and masses of epithelial cells. The urethral orifice may also show evidences of this condition in the ectropion of the mucous membrane, and the entire urethra may be thickened, and feels like a rigid tube underneath the finger. The urethral mucosa may be very greatly flattened, and shows in its entire extent a granulated or peculiar jelly-like appearance, or these areas may be more or less isolated and present a distinct contrast to the normal rosy color of the surrounding mucosa.

Near the glandular lacunæ within the urethra reddened areas which bleed lightly on touch may be seen, and in the purulent secretions from them gonococci may frequently be demonstrated.

In these cases it is not infrequent for the so-called gonorrhœal threads (tripper fäden) to be voided with the urine, which also contains gonococci. In the further progress of the case cicatricial contraction throughout the whole course of the urethra or its circular structures may occur; this, however, is much less frequent in women than in men.

Gonorrhœal inflammation of the epidermal surfaces of the external genital organs is always a secondary affection, and is not specific in its character, but of an eczematous nature, due to the irritation of the discharges. The skin surfaces of the perineum, the inner sides of the thighs, the labia, and the clitoris become reddened and very œdematous, and if absolute cleanliness is not observed small superficial ulcerated patches may form.

As a secondary result small condylomata are frequently noted. In many cases these growths are attributed by the inexperienced observer to syphilis, but unless there is a very characteristic syphilitic history they are much more likely to be of gonorrhœal origin.

Inflammation of the epidermal surfaces, as a rule, subsides in a few days without any sequelæ. In some cases, however, especially where cleanliness is not observed, it may become chronic and assumes a pruritic type. Sänger calls this vulvitis pruriginosa.

Bartholinitis is usually due to primary gonorrhœal infection. A tense, painful, fluctuant sac is frequently formed in the labium, which may be absorbed, or, as is frequently the case, ruptures on the surface. When this condition becomes chronic the gland is felt as a dense, hard body, and on pressure a small amount of purulent, milky or viscid secretion may be expressed from the common duct.

In chronic cases peculiar reddened spots mark the exits of Bartholin's ducts, which have been described by Sänger as maculæ gonorrhoicæ. In other inflammations, however, these maculæ may appear, and they cannot therefore be considered as absolutely characteristic of gonorrhœa.

Bumm differentiates between a pseudo-abscess, which is a simple accumulation of pus in Bartholin's duct resulting from the closure of the external orifice, and is a typical gonorrhœal product, and a true abscess due to a mixed infection which invades and destroys the ultimate acini of the gland.

A true gonorrhœal inflammation of the vagina is of rare occurrence, compared with that of the urethra and cervix. This is due to the fact, which has been pointed out in the description of the pathology of this disease, that the vagina is covered with stratified epithelium and possesses no glands. Inflammation of this organ is therefore not of a catarrhal nature but is a true dermatitis.

See later Literat.

This inflammation may either occur as a diffuse reddening or as numerous reddened points.

Inflammation of the cervix, in point of frequency, is second to the urethra.

The first symptom noticed is a slimy, bloody secretion, which later assumes a milky or purulent character. As a result of the desquamation of the epithelium erosions of the cervix often occur.

Klein maintains that the majority of true erosions seen in gynecological cases are of a gonorrhœal nature.

As a result of the closure of the glandular stomata retention cysts (Nabothian follicles) are formed.

In the acute stage the mucous membrane of the cervix may become so congested and swollen that it projects as a sensitive, reddened, rosette-like growth from the os externum. Cervical gonorrhœa is especially prone to become chronic, and is the site of predilection for the so-called latent gonorrhœa, which may be most persistent and capable of transmitting an infection without, however, showing marked subjective symptoms.

In many cases gonorrhœa is limited to this area and does not pass the os internum. When it does a general fundal endometritis usually occurs.

In the acute stage there may be extreme tenderness over the uterus, especially on pressure, and if there is stenosis of the cervical canal agonizing uterine colic may be a prominent symptom. At first the uterine discharge is of a bloody, serous or purulent nature, but later is transformed into a slimy secretion. In chronic cases there may be a profuse and constant discharge of a viscid, catarrhal mucus. After the gonorrhœal process has invaded the fundus there is constant danger of its passing over into the Fallopian tube and forming an acute salpingitis which becomes more or less chronic and finally terminates in pyosalpinx. In natural order the pelvic peritoneum and the ovary ultimately may be involved.

The pathology of gonorrhœal inflammation of the Fallopian tube is extremely interesting, but is so extensive that space cannot be given to it in this review.

As symptoms of the invasion of the Fallopian tube, the patient complains first of sharp pain in one or both ovarian and tubal regions, which is greatly increased by bimanual examination.

All physical movements, such as dancing, riding, walking in rough places, etc., increase the pain very much. Rest in bed may give almost complete relief from these symptoms. With the first appearance of the acute pain the temperature may rise 1° or 2° F. above normal. In the chronic stages the symptoms become persistent, and the patient may be a constant sufferer for years, being simply able to drag about but never well. Inflammation of the ovary and peritoneum may be looked upon as secondary to tubal gonorrhœa, and is probably due to the irritation of the toxins rather than to the specific action of the gonococci.

Considerable dispute has arisen as to the question of a gonorrhœal metritis, Wertheim, Klein and others claiming that this may be secondary to endometritis, while Bumm states unreservedly that rarely if ever do the gonococci penetrate below the limiting membrane of the mucosa.

Diagnosis. The diagnosis of gonorrhœa in women is much more difficult than in men, chiefly because a whitish, leucorrhœal discharge may be considered more or less normal in women, whereas in healthy men there is no urethral discharge. The mere fact that a man has such a discharge is very strong presumptive evidence in favor of its specific origin, whereas no significance may be attached to a leucorrhœal discharge in women.

The certain diagnosis of gonorrhœa in women depends very largely upon the demonstration of the gonococcus in the secretions. A profuse purulent urethral discharge is quite as diagnostic as it is in men, but

when we take into consideration the fact that the acute urethritis is comparatively fleeting in its character, and that the disease may persist months and even years after all of these symptoms have completely disappeared, it will be seen that little importance can be placed upon this sign. Its presence is of great diagnostic value, but to assume because of its absence that there is no gonorrhœa would be a serious error.

In the chronic process it may be possible to express a small amount of purulent matter from the urethra or from the ducts of Bartholin's glands, but this also may be absent. In the diagnosis of chronic vulvitis, vaginitis, cervicitis, endometritis, and salpingitis the clinical symptoms are by no means pathognomonic. When there is profuse yellowish discharge from any one of these organs it is presumptive evidence in favor of this disease, but even then a positive diagnosis cannot be made. The most certain method, therefore, is the demonstration of the gonococci in the secretions.

In securing the pus for this examination the greatest precaution should be observed not to have it contaminated by other organisms. For bacteriological examination the vaginal discharge is almost valueless, because it contains as a rule such a large number of cocci and other bacteria. Secretions from concealed passages are the ones which are to be employed in a microscopical diagnosis. The urethra should be exposed, carefully cleansed with a mild disinfectant solution, and with the platinum loop the secretion should be withdrawn and placed upon a cover-glass; if there is no urethral secretion it may be possible to express a drop from Bartholin's duct. The cervix should always be examined, and to this end the Sims posture, which permits its complete exposure, should be employed. Secretions obtained directly from the cervical canal are the most reliable, for when gonococci are demonstrated in them there is no longer any doubt as to the diagnosis.

For clinical purposes methylene-blue solution is a practical and easily manipulated staining fluid. The secretion may be spread out on the cover-glass or on a slide, the latter being usually the better. If it is very small in amount or rather thick and viscid, it may be diluted slightly with a drop of normal salt solution. After spreading it evenly, it is dried by passing it a few times over the flame of an alcohol lamp or gas-burner. Methylene-blue solution is then dropped upon the slide and allowed to remain for one-half to one minute, and is then carefully washed off in running water and dried with bibulous paper or with a clean, white handkerchief. It is not necessary to protect the stained area with a cover-glass, for it may be inspected directly either with a high-power or (which is always preferable) with a one-twelfth oil-immersion lens.

To be certain of the diagnosis the gonococci must be found inside of the pus cells. While the presence of typical biscuit-shaped cocci in

pairs free in the secretion without the association of other bacteria is very significant, it is nevertheless unsafe to make a positive diagnosis. One should never be content with one search, for gonococci may be found in a certain number of cases only after repeated examination. In one instance which I recall at least twelve negative examinations were made on different days before the gonococci were at last found; in this case the history and the symptoms so strongly pointed to gonorrhœa that the examination was not abandoned until we were finally rewarded by finding a very large number of intracellular micro-organisms.

Again, as to the question of the diagnosis being established in this way there has been considerable dispute, but there is now a general consensus of opinion as to its value. In some instances in which I have been unable to find the gonococci even after repeated examination the symptoms have been so characteristic that I have felt justified in making a tentative diagnosis of gonorrhœa under the assumption that the micro-organisms were concealed.

Prognosis. Although the result of gonorrhœal infection in women may be of the most serious nature, and, indeed, this is so frequently the case that one is almost inclined to say that all cases are serious, nevertheless the fact must not be lost sight of that a considerable proportion of cases run a simple, mild course, and with the exception of a more or less acute urethritis or vulvitis no other part of the genital tract is involved.

Quite correctly Bumm claims that one cannot arrive at a proper conception of the ravages of this disease without having further statistics from which to draw conclusions. This undoubtedly is the proper attitude to assume, for the gynecologist is very much more likely to see the serious cases, whereas the simple cases either are treated successfully by the general practitioner or recover without treatment.

It has been generally stated by Continental statisticians that this disease was much more frequent in New York and other large American cities than in the European cities. For instance, Noeggerath, to whom this impression is referable, claims that in New York of every 1000 men at least 800 suffer from this complaint; and also further makes the absurd statement that of this number at least 90 per cent. are married men, and concludes by saying that of every five married women at least three have become thus infected.

These statements are unquestionably exaggerated, and I cannot imagine from what source this writer has drawn his statistics. Bumm, however, states that Noeggerath has made a mistake, and that in later years he has become convinced of it, and has retracted his statement.

According to E. Schwarz, in the larger cities of every 100 married men ten have chronic gonorrhœa, whereas ten others acquire a sub-

sequent attack in the course of their marital life. As a result of this condition five of the 100 married women become infected. In a general way this coincides with the observations of Sänger, who found among 1930 gynecological cases treated in his private and public clinic 230, or 10 per cent., suffering from the effects of this disease. In a later series of cases, of 161 women who were carefully examined twenty-nine, or 18 per cent., were found infected. According to Zweifel, 10 to 11 per cent. of private patients consulting him are sufferers from this disease. In the Heidelberg Obstetrical Clinic, of 108 pregnant women who were carefully examined, in thirty (27 per cent.) gonococci were found. Schwarz, also, in 1617 pregnant women found this organism in seventy-seven cases, and Lomer, in Schroder's clinic, nine times in thirty-two cases.

The frequent occurrence of gonorrhœa in the pregnant state shows that this disease is not so invariably followed by sterility as is generally stated, for unquestionably a large number of these patients have been the subjects of a chronic infection which is merely lighted up and becomes active during the pregnant state.

Accepting that on an average 12 per cent. of all marriages are sterile, it may be admitted that at least 8 per cent. of these are due to gonorrhœal infection. In considering the question of sterility, both sides of the marital house must be taken into consideration, for the husband rather than the wife may be sterile as a result of this disease.

In women, so far as the question of prognosis is concerned, the localization of the pathological process is the deciding feature. According to the statistics and experience of such men as Bumm and others, in acute gonorrhœa of the urethra and cervix the prognosis is favorable, for, notwithstanding the absence of all treatment, many of them are completely healed. In comparatively few instances is the entire genital tract infected, and when this occurs it is usually due to insufficient treatment, active exercise at the time of the menses, sexual excesses, and, above all, the repeated infection of the wife by the chronically diseased husband. So long as chronic gonorrhœa exists in the husband the treatment of the wife is absolutely useless. If the infectious process at last gains access to the uterus and becomes chronic the prognosis as to a complete cure is doubtful, for notwithstanding the most approved treatment it is sometimes impossible completely to eliminate the gonococci from the endometrium. After the greatest pains are taken to relieve this condition the symptoms may disappear for a time and the physician congratulates himself that the patient is at last well, when suddenly without any premonition the chronic process recurs, and again the patient suffers from the same symptoms as before.

Notwithstanding the fact that the relief of symptoms and cure of the patient after the onset of tubal gonorrhœa is held by many gynecol-

ogists to be practically impossible, Bumm, Freund, Sänger and others take a more conservative view, and claim that while it is not likely that the tissues may be restored to their former integrity, nevertheless, even after a considerable quantity of pus has formed, it may become absorbed and the patient may again be completely relieved so far as any disagreeable symptoms are concerned. Certainly, to accomplish this end the greatest pains and care in the treatment of the case should be exercised.

According to the present status of our knowledge we can with perfect propriety try conservative methods of treatment even in gonorrhœal pyosalpinx before resorting to operation. In rendering a prognosis in these cases, the probability of an ultimate operation should very carefully be explained to the patient or to her friends in order that bitter disappointment may not be felt when it is found after careful antiphlogistic treatment that this course is absolutely necessary.

TREATMENT. Concerning the treatment of this infection there are two opposing views: one holding that absolutely nothing should be done in the way of local therapeutics, with a view to the self-limitation and self-healing of this disease, while the opposite insist that active germicidal remedies are indicated from the very onset.

The first view is based upon the fact that gonorrhœa in its acute stage is practically always confined to the lower genital tract, and as has been shown in the consideration of the pathology of this question, frequently does not tend to extend beyond these areas. Those writers, therefore, who take the position that no local therapeutic remedy should be employed do so because they fear that through the application of remedies in the form of douches, local ointments, vaginal suppositories, etc., the gonococci may be carried from the lower into the higher genital tract, and thus leave the patient in a worse condition than were nothing at all done. This view is taken by such eminent authorities as Bumm, of Basel, who has, as I have already stated, gone very thoroughly into the question of the pathology, bacteriology, and treatment of gonorrhœa, and by Behrens, the chief examiner of prostitutes in Berlin.

On the other hand, Neisser, who is equally eminent as an authority, not only because of his discovery of the gonococcus but also because he, too, has had quite an extensive experience in treatment, claims that the moment the infection is detected active germicidal treatment should at once be instituted.

The conservative treatment consists in absolute rest, because, as stated by Bumm, the various movements of the body in walking and other physical exercises may cause a dispersion of the infectious matter from its primary seats to the upper genital tract. He especially advises that absolute rest in bed shall be enjoined during the menstrual period, at which time the spread of the infection is much more likely to occur than in the menstrual interim.

In his protest against local treatment, the question is asked by Bumm how often is a urethral gonorrhœa transmitted to the cervix, and thence to the uterine cavity, through instrumental manipulation employed in the treatment.

As in all disputes of this nature, there is possibly a midway position which may safely be maintained. For instance, in the acutely infected individual, suffering with considerable purulent discharge, limited to the external opening of the urethra and vulva, it would indeed be bad policy to allow the discharge to continue without applying cleansing and local bactericidal treatment, just as in all infectious processes. Cleanliness is the first desideratum, and really in the majority of cases is no doubt the only measure upon which special stress should be laid.

The introduction at this stage of douche nozzles into the vagina and the urethra are, however, unquestionably reprehensible, unless very carefully conducted by a trained nurse or by the physician himself. To place these remedies in the hands of the patient is very dangerous, simply because, as ordinarily carried out even by very intelligent individuals, the vaginal douche may be the means of transporting the gonococci from the vulva to the cervix. Above all things to be avoided in gonorrhœa is this extension, for if the micro-organisms once gain access to the uterus we may in the natural course of events look for a prolonged and possibly a chronic course of the disease, which sooner or later terminates in pyosalpinx and more or less extensive perioöphoritis and pelvic peritonitis.

In rare cases in the adult the injection of warm water, or a 1 per cent. solution of ichthyol, as advised by Bumm, with daily sitz baths and cleansing of the outer genitals with a 1 : 1000 solution of bichloride of mercury may be advised.

For the treatment of the secondary eczema of the adjacent epidermis lanoline or a mild fatty ointment, to which some simple astringent is added, is of service.

If at the end of four to six weeks the infectious process passes over into a subacute stage in which the hyperæmia of the mucous membrane increases and the secretion becomes of a slimy, milky consistency, then, according to Bumm, local applications may very successfully be instituted. As in all conditions which are difficult to treat, so in gonorrhœa innumerable remedies have been suggested, some of which have proved of value, but the great majority have been absolutely ineffective.

According to Bumm, the remedies which are based on bacteriological experiment for their inhibiting effect are absolutely worthless in the treatment of subacute and chronic cases. The closest possible knowledge of the localization of the infectious process and a systematic micro-

scopical control of the case are necessary. In men only the complete disappearance of the discharge may be taken as evidence of complete healing, but in women a certain amount of discharge is normal.

All gonorrhœal processes are finally healed through the natural reaction of the infected tissues against the organism; without this assistance a complete elimination of the gonococci is impossible. The most unfavorable cases, therefore, are the chronic ones, in which the tissues have become accustomed to the presence of the gonococci and the epithelium of the mucous membrane, as a result of long-continued irritation, has changed from a columnar to a stratified pavement variety.

As has been seen in the foregoing review, acute gonorrhœa, at least of the external genital organs, is distinctly self-limiting in its course. The chronic cases tend to become localized, and frequently small infected areas will be overlooked, and a patient may be pronounced cured who is still capable of transmitting the infection.

Concerning treatment, Bumm, Klein, Sänger and others quite properly lay stress upon the necessity of first discovering the point of localization, and then directly applying topical remedies. In acute urethritis no treatment in the way of injections should be employed; if, however, the inflammation runs into a subacute form, silver nitrate, 1 : 1000 solution, or ichthyol, 1 : 5 to 100, injected into the urethra is frequently very efficacious. Unless great force is used in the injection there is little danger of the fluid entering the bladder, and even in this event no serious trouble will be caused. The use of ichthyol in the treatment of gonorrhœa is comparatively recent, but I am sure that it will appeal to all as thoroughly rational who have had occasion to use it for superficial inflammatory conditions. Neisser, after having thoroughly tested the value of the various silver salts, has at last settled upon this remedy as being superior to all others; and in this opinion he is sustained by Jadassohn and Bumm. Jadassohn has also very strongly advised the use of argonin, a silver preparation, in 1 or 2 per cent. solution, which has the advantage over the usual silver salts in that it does not produce irritation. The older remedies, such as the copper, zinc, and lead salts, are much less employed than formerly, because they have been superseded by remedies which act more efficaciously and with less danger of disagreeable sequelæ. Although balsam of copaiba as an internal remedy has no special germicidal action, nevertheless Bumm advises it upon empiric grounds, and claims to have had surprisingly good results from its use in some cases. This expression I am certain is in accord with the opinion of many practitioners who look upon this remedy with great favor.

In chronic urethral gonorrhœa the endoscope should invariably be employed to locate the inflamed areas, which may then be treated with

a 20 to 50 per cent. silver nitrate solution, or with a galvano-cautery. By means of the latter instrument the chronic areas of infection are effectively destroyed and are substituted by a healthy granulation tissue.

In the topical treatment of the vulva and vagina a 1 to 10 per cent. silver nitrate solution applied through the speculum is of great value. Under its effects the reddening and swelling frequently disappear very rapidly. When the follicular areas of the vulva or Skeen's glands are inflamed the galvano-cautery may be employed as above described.

In the treatment of inflammation of Bartholin's gland hot applications may sometimes be of service, but, as a rule, complete extirpation is advisable, for when the gland once becomes the seat of chronic infection it will not, as a rule, give way to any form of treatment but persists as a source of continued infection.

As has been indicated in the consideration of the pathology of gonorrhœa, when it once gains access to the uterus it is exceedingly obstinate in its course, and may continue for years without any tendency to self-cure. It is sometimes a difficult question to determine whether the cervix alone or in conjunction with the entire uterus is infected. If there are no symptoms pointing to infection of the fundus uteri, treatment should be directed alone to the cervix. To this end the os uteri should be well dilated, and it may be necessary in nullipara to make a bilateral discission. After having thoroughly cleansed the mucous membrane, silver nitrate in 1 to 5 per cent. solution should be applied until the mucous membrane becomes overlaid by a white coagulum. Ichthyol in 5 to 10 per cent. solution may also be applied on cotton or on a small strip of gauze, and left *in situ* for many hours. This is perhaps one of the best remedies.

If this line of treatment is patiently carried out, a cure in the majority of cases may be effected; but unfortunately it is at best slow, and both patient and physician may lose courage and give up the attempt. If good results are not effected in this way and gonococci persistently reappear in the secretions or when the symptoms of endometritis become so prominent that one is forced to the conclusion that the uterine cavity is generally infected, local treatment of the fundal endometrium may safely be begun. This, however, should be carried out with the greatest precaution, for it is very easy to cause a transferrence of the gonorrhœal process from the uterus to the tubes, which is yet a more serious involvement.

When, notwithstanding the greatest care in the treatment of the endometritis, or in the natural course of the disease, the infectious process passes over into the tube the treatment should consist of absolute rest in bed, cold or hot applications to the abdomen, careful regulation

of the bowels, and light diet. Rest during the acute infection is one of the chief points in the treatment. Notwithstanding the fact that the symptoms may disappear and the patient may be relieved completely of pain, she should not be allowed, even though importunate in her petitions, to at once get upon her feet, for the infectious process may again become active.

Bumm states that when the tubes become acutely infected the patient should remain two months in bed, and may only be allowed to get up after the pain has ceased and the temperature has been normal for a full month. Upon the course of the first attack the future of the patient very largely depends, for if at this time pus does not collect in the tube, and the pelvic peritoneum is affected only to a limited degree, the prospect for healing is good; if, on the other hand, the patient is allowed to go about too soon, and there is a recurrence of the disease, a pyosalpinx may result, and the peritoneum will then become further involved. In insisting upon the cessation as far as possible of all bodily movements, and with persistence in the antiphlogistic treatment, the patient may entirely recover. Certainly the wider becomes our experience in tubal infections the more we are convinced that even pyosalpinx when properly treated may subside and leave the patient, so far as her symptoms are concerned, absolutely well. Of course, it is not conceivable that the tissues and organs can be restored to normal, for the majority of these patients remain permanently sterile, showing that there has been a radical organic impairment.

After the gonorrhœal process has invaded the tubes all forms of uterine treatment should be stopped or conducted with the greatest precaution. To avoid possible danger it is unquestionably better to err on the side of not treating at all than to carry it out too vigorously, with its attendant danger of increasing the disease of the tubes. When the tube is converted into a pyosalpinx and persists, notwithstanding its careful conservative treatment, operation must be advised.

Upon the methods of operating in these cases there is a distinct disagreement, in that such an eminent authority as Bumm claims that the total removal of the tubes, uterus, and ovaries is the only advisable course, whereas other gynecologists quite as vigorously claim that only the actually involved tubes must be removed, leaving behind the ovaries and uterus. Personally, I am strongly inclined to the latter view, for while the convalescence admittedly is not so satisfactory and the possibilities of a continuance of the process are greater, nevertheless a considerable proportion of these cases are completely healed and have no further trouble. The fact that gonorrhœa is much more likely to occur in young than in older women causes me to incline very strongly to the conservative line. I have seen both plans of treatment carried out,

and this opinion, therefore, is largely based upon actual experience. Total hysterosalpingo-oöphorectomy is an operation which should never be performed in the young woman if there is any possibility of avoiding it, even though the convalescence of the patient may be slower, and the dangers of a recurrence are greater when treated otherwise.

The treatment of gonorrhœa during pregnancy consists in the maintenance of absolute cleanliness, for to attempt to institute curative remedies at this time is fruitless. Vaginal irrigations should be given daily, but according to Bumm should be stopped about one week before the expected confinement. On account of the dangers of infection of the child's eyes during parturition, the most vigorous means should be employed to prevent this serious complication. Irrigations after labor has begun and the greatest care in the treatment of the infant's eyes immediately after birth are the best prophylactic means for the prevention of ophthalmia neonatorum.

As a result of this review of the treatment of gonorrhœa, it is quite evident that absolute rest in the acute stages of the infection is one of the most important essentials. The second point which is brought out is that the silver salts, notwithstanding the fact that they have been very largely condemned by a number of writers, still maintain a very important place in the treatment.

Thirdly, that of the more recent remedies which have been suggested, ichthyol unquestionably is the most valuable, because it is non-irritating, is very effective in alleviating pain and reducing the inflammation, and absolutely free from any disagreeable sequelæ, such as are occasionally noted after the use of the more irritant remedies.

A point also upon which special stress should be laid is that the principle of immediate germicidal treatment in acute cases, as insisted upon by Neisser, appears more judicious than the conservative plan employed by Behrens and others.

REVIEWS.

A Manual of Diseases of the Nose and Throat. By Cornelius G. Coakley, M.D., Clinical Professor of Laryngology in the University and Bellevue Hospital Medical College, New York City. Illustrated with 92 engravings and 2 colored plates. New York and Philadelphia: Lea Brothers & Co.

It is a pleasure to find a book which amply fulfils the purpose for which the author states he has written it. Dr. Coakley explains in his preface that his book is intended to meet the needs of the student and the practitioner, and we know no book of a similar nature which will better fill their wants. The author has had large experience as a teacher, and evidently appreciates the value of placing himself in the position of those who will use his book, and writes from their point of view as well as that of one thoroughly a master of his subject. The grouping of the various topics is such as to render the book convenient for reference in looking up particular points, and being written in a very concise yet readable style, it takes but a few moments to comprehend the essential facts under discussion. There is a refreshing absence of references to the divergent views held by different authorities on the same subject. There is no attempt made to furnish students with elaborate bibliographical and historical details which are of no practical value. The various operative procedures described are those which are most generally used, and the mind is not confused and distracted by accounts of modifications introduced by other operators, usually in a vain attempt to do something original whereby to perpetuate their names. A large proportion of space is given to the technique of examination of the nasal cavities and the throat, and this is one of the traits which especially commends the book. To those who devote the principal part of their time to work in laryngology or rhinology such details may be unnecessary, but to the beginner or one unfamiliar with the subject nothing can be of more importance than a knowledge of how to perform such manipulations correctly. The author has also very wisely devoted much space to the differential diagnosis of the lesions met with in the nose and throat. Thus he does not content himself with saying that the diagnosis of a polypus from a papilloma or a malignant growth may be difficult, but goes into the points whereby the diagnosis may be established in a special section of the article on the subject under discussion. In fact, this attention to diagnosis is so prominent as to be almost a unique feature in a work of this character. The book is thoroughly up to date in every way, presenting, however, not the latest theories but the latest facts The author expresses his confidence in the antitoxin treatment of diphtheria, and gives an excellent *résumé* of the best methods of applying it The book contains many illustrations, most of them taken

from standard works on the nose and throat, some of them original. The volume is very compact, but the print and paper are most excellent, and render the book very attractive. There is also a very complete index, which adds greatly to its usefulness. Dr. Coakley's book we regard as one of the most concise yet comprehensive epitomes of laryngology and rhinology that has ever been written. It is certain to come into immediate popularity with teachers and students. F. R. P.

A TEXT-BOOK OF DISEASES OF THE NOSE AND THROAT. By D. BRADEN KYLE, M.D., Clinical Professor of Laryngology and Rhinology, Jefferson Medical College, etc. With 175 illustrations, 23 of them in colors. Philadelphia: W. B. Saunders, 1899.

THIS book contains many strikingly original features, which place it much above the average of the text-books which come forth in such unceasing stream. The author has elaborated a system of classification for the morbid conditions found in the nose and throat which possesses great merit for its originality and as an effort to place the study of such conditions on the basis of a rational pathology. With the exception of the work of Lennox Browne, most of the attempts at a systematic classification which have heretofore been made have rested almost solely on clinical evidence or on the crudest kind of pathological study. Dr. Kyle's classification is, as we have said, original and in many instances differs strikingly from our preconceived notions, but he supports his views in most cases with incontestable evidence. He has worked for many years conscientiously with his microscope, and now puts forth the result. Another pleasing feature is the systematic arrangement of his subject-matter, whereby the study of any particular portion of the work is much facilitated. For instance, we find, under each subject admitting of such treatment, first, the synonyms, then the author's definition, a discussion of the etiology and pathology of the lesion, the symptoms, diagnosis, prognosis, and, lastly, the treatment. The system which pervades the book is also illustrated by the tables placed at the opening of each chapter. This arrangement is worthy of note, as it enables one to not only learn what are the contents of an individual chapter at a glance, but also to know the relation occupied by various morbid conditions to one another, according to the author's views. The book is particularly adapted to meet the needs of those who are making a special study of rhinology and laryngology. The detail with which it goes into every subject and the accuracy of its descriptions will render it of great value to those who wish a guide to help them in their practical work. Much attention is given to the constitutional disturbances which underlie many of the local disorders which manifest themselves in the nose and throat. Dr. Kyle does not content himself with saying that "tonics are indicated" or that "the constitutional condition should be rectified," but goes into the matter and states what he considers the best tonic or alterative or what the most necessary hygienic regime indicated under the circumstances. The author has a pleasing style, and writes with a zeal and enthusiasm for his subject which are very attractive. It is rare

to find any book possessing the wealth of illustrations to be found in Dr. Kyle's, and rarer yet to find such a large proportion of original illustrations. Many of these are executed from specimens prepared by the author, and one can but be struck with the accuracy of the pictures they convey. Some of them are particularly worthy of note, such as those which illustrate the difference in structure which exists between the soft faucial tonsil and the same organ after it has become fibrous from chronic inflammation, or between the soft and the fibrous adenoid, and the plates illustrating the microscopical alterations undergone by the tissue in atrophic rhinitis. We think Dr. Kyle's book is destined to take its rank as an authority on the subjects whereof it treats, and to stand with the books of Lennox Browne and Bosworth as one of the most essential works of reference in laryngology and rhinology.

F. R. P.

DISEASES OF THE HEART AND AORTA. By GEORGE ALEXANDER GIBSON, M.D., D.Sc., F.R.C.P. Ed., F.R.S.E. With 210 illustrations. Edinburgh and London: Young J. Pentland. New York: The Macmillan Co.

IN 1705 Hook wisely suggested, "Who knows but that one may discover the works performed in the several offices and shops of a man's body by the sounds they make, and thereby discover what instrument or engine is out of order?" This seed bore sadly little fruit in a century. One learned author, for example, writing in 1801 for Sampson, Low & Co.'s *Encyclopædia*, included all cardiac affections under the title "*Palpitatio*" (palpitation of the heart), and very curtly stated that this trouble was due to two general causes: organic change in the heart itself and outside affections, such as dyspepsia. If the difficulty were the result of one of the latter class of causes, treatment directed to the origin of the evil was likely to relieve it. If it were organic nothing could be done. The actual determination that the trouble was organic remained, as we know, purely speculative so far as concerned definite methods of diagnosis, particularly auscultation. At the beginning of another century, however, the sounds made by the "instrument or engine" have long been old friends, and the great danger has come to be a tendency to attribute too great an importance to variations from the normal sounds and to rely upon small distinctions in these in differentiating the various lesions. While Dr. Gibson's work is comprehensive in most ways and in many parts is very admirable, the portion devoted to the valvular lesions, the most important division of the book, is worthy of least praise. There have been many valuable recent additions to the formal literature dealing with diseases of the heart, and wise and conservative authors are wholly decided in their teaching that dependence upon the characters of murmurs alone is usually a very shaky method of establishing a diagnosis. It must, therefore, arouse some surprise when one sees it stated here that a systolic murmur in the aortic region transmitted into the vessels of the neck is almost sufficient to establish a diagnosis of obstruction at the aortic orifice. Fifty years ago Walshe wrote: "The murmur of chronic aortic constriction is one of those open to the greatest number of imitations," and we prefer to accept

even such ancient teaching which still, we think, remains true; to be told that the pulse is of very little value in the diagnosis of aortic obstruction is also unexpected. And while there may be a justifiable difference of opinion concerning the existence of a physiological tricuspid incompetence, there is no question that nowadays most students of diseases of the heart demand better evidence of this lesion than a murmur of peculiar character and distribution, while Dr. Gibson states that the determination of the position of maximum intensity of the murmur "overcomes every difficulty in recognizing its significance." A similar dependence upon slight differences in murmurs is shown in the teaching that a "presystolic or diastolic murmur with its maximum intensity in the tricuspid area must be allowed to be pathognomonic of obstruction of the right auriculo-ventricular orifice." It is true, though surprising, that this view is held by a number of other prominent British authors, but the evidence offered by them or by Dr. Gibson is merely the observation of a few cases—some of them during life only, others at the post-mortem table as well, in which this sign was, or was believed to be, associated with this lesion. This certainly does not constitute proof that the murmur is pathognomonic, and, indeed, it is hard to convince one now that any localization or transmission of a murmur may be said to be pathognomonic, particularly of lesions so difficult to diagnose as is tricuspid obstruction. To instruct one's readers to depend very largely upon murmurs in making a diagnosis seems narrow and somewhat antiquated. Other signs of the mechanical effects of a lesion must be found before any diagnosis can be positively made.

The sections upon diagnosis in this part of the book are unsatisfactory in several instances. As an example it may be noted that it is stated that the diagnosis of the existence of mitral incompetence is always an easy matter. The only point apparently considered to be of diagnostic importance is the determination whether there is a primary valvular lesion or regurgitation as a result of relaxed walls. Accidental murmurs are not discussed in this connection, difficult as it is oftentimes to distinguish them from those due to organic incompetence, and though the condition of the right heart and of the second pulmonary sound receive mention under symptomatology they are not insisted upon as characteristic changes almost essential to a diagnosis, and it seems strange to leave one unconvinced of their importance. There are many things, however, of great interest and value in this division of the book. The symptomatology and etiology particularly are discussed in a very interesting way, and the pathology is adequately treated.

Congenital diseases of the heart are considered at moderate length only, and Dr. Gibson wisely does not encourage one to indulge in speculative diagnoses of the more obscure forms. The diseases of the myocardium are presented in a very admirable way. We must assent with the view expressed, that it is irrational to divide angina pectoris into true angina and pseudo-angina. The closing chapters on diseases of the aorta are extremely instructive and interesting, and are followed by a magnificently large and carefully prepared bibliography.

There is a large amount of valuable material in the book, much of which is derived from Dr. Gibson's own experience and labor. It tends, however, toward teaching one to diagnose cardiac conditions rather from the stand-point of clinical observation than from a consideration of the pathological changes in the heart and the resulting mechanical

disturbances, and one feels that he has gained interesting ideas from reading the work rather than that he has been put upon a solid basis in formulating an exact diagnosis. D. L. E.

A Contribution to the Surgery of Fractures and Dislocations of the Upper Extremity based upon an Analysis of about Seven Hundred Consecutive Cases Observed at the Manchester Royal Infirmary. By J. E. Platt, M.S. (Lond.), F.R.C.S., Honorary Surgeon to the Hulme Dispensary; Surgical Officer to the Cancer Hospital, Manchester; late Resident Surgical Officer to the Manchester Royal Infirmary. Illustrated by 23 drawings and skiagrams. London: H. K. Lewis, 1899.

This little book, while modestly styling itself a contribution to the surgery of the subject, really rises to the dignity of a treatise. Besides an analysis of the cases observed by the author, he has gone over a great deal of the literature, and embodied in the book the opinions of many writers, so that it is to some extent a critical summary of the anatomy, etiology, diagnosis, and treatment of these injuries, and this feature, in connection with the references furnished at the end of each section, will be of considerable value to the busy surgeon. There are numerous tables carefully compiled, the skiagrams have the merit of showing clearly what they are intended to show, and the author's style is terse and pleasing. The methods of treatment recommended are, as a rule, similar to those popular with American surgeons. Full justice is not done to the treatment of fractures of the lower end of the humerus in the position of extension, a method we believe to be useful in some cases, and treatment of these same injuries by acute flexion, according to the methods of Jones and Smith, is mentioned without comment. We believe Stimson's dressing for upward dislocation of the outer end of the clavicle would prove more satisfactory than the devices described. But the book, on the whole, is a worthy addition to the literature, and we believe will meet with hearty commendation of surgical practitioners. J. H. J.

Notes on the Modern Treatment of Fractures. By John B. Roberts, A.M., M.D., Professor of Surgery in the Philadelphia Polyclinic; Mütter Lecturer on Surgical Pathology of the College of Physicians of Philadelphia. With 39 illustrations. D. Appleton & Co., 1899.

The study of fractures has always offered peculiar attractions to surgeons of an original and mechanical frame of mind. At the same time in probably no department of surgery has conservatism been more firmly rooted. In this field of practice, in which the laity and the profession unite in fixing the responsibility on the surgeon, the weight of authority has been the prop of many of the practices and beliefs handed down from the fathers of the profession. This little book, which is a

collection of essays published at various times in various phases of the subject, is at the same time a plea for simplicity and common-sense in the management of this class of injuries, and an argument in favor of some of the newer methods of treatment, such as tenotomy, open incision, the author's method of subcutaneous nailing, etc. Two of the older papers here published, and evidently written some years since, viz., those on refracture for the relief of deformity and fracture of the cranium, are devoted to the defence of opinions now generally accepted, time having justified the author's position. Other chapters deal with the prevention of deformity—the treatment of fractures of the lower end of the humerus, in which the author approves of the treatment in the extended position, a method too little known, and the treatment of fractures of the lower end of the tibia and fibula. A considerable portion of the book is devoted to the consideration of fracture of the lower end of the radius, a subject to which the author has given much attention, and on which his views are well known. The points on which he lays most stress are early, forcible, and accurate reduction, and the application and early removal of simple dressings as elements of prime importance in the avoidance of deformity and disability, which his experience has convinced him are frequent sequelæ of the ordinary methods of treatment. The book is a thoughtful and suggestive one, and will be read with much interest by students of surgery. J. H. J.

OPERATIONS ON 459 CASES OF HERNIA IN THE JOHNS HOPKINS HOSPITAL FROM JUNE, 1889, TO JANUARY, 1899. THE SPECIAL CONSIDERATION OF 268 CASES OPERATED ON BY THE HALSTED METHOD, AND THE TRANSPLANTATION OF THE RECTUS MUSCLES IN CERTAIN CASES IN WHICH THE CONJOINED TENDON IS OBLITERATED. By JOSEPH C. BLOODGOOD, Associate in Surgery, Johns Hopkins University, and late Resident Surgeon, the Johns Hopkins Hospital. From the Johns Hopkins Hospital Reports, Vol II.

THE great improvements in the results of operations for the radical cure of hernia, improvements which have placed on a firm basis a procedure which until recent years has been looked upon with distrust by conservative surgeons, have been mainly due to two factors, viz., the introduction of asepsis and an appreciation of the mechanical problems to be met and solved. To these may be added as a third factor a painstaking attention to detail in every stage of the operation, an attention which considers every step in the technique to be worthy of the closest scrutiny and study. In the minds of many the Halsted and Bassini methods, the favorite ones in this country, and which appeared about the same time, are considered practically the same, but Halsted claims that the features in which his operation varies from that of Bassini are essential points of difference, and we think a careful scrutiny of this elaborate report before us bears out this claim. Certainly, where altered or modified there has been corresponding variation in the results. The Halsted operation, as modified by its originator

and by his assistants, is not identical with that published ten years ago, and the improvements are due to careful attention to what might be easily considered unimportant details did not a study of the statistics show the marked influence they have had on the final results. This report comprises a description and history of the operation, and of all the modifications it has undergone, and a statistical record of the cases operated upon, the cases being divided into groups according to the variety of hernia and method of operation for better analysis and study. The division and subdivision employed is sometimes a little confusing. There are special sections on the contents of the sac in inguinal hernia, the relation of the sac to the cord, the age of the patients, strangulated hernia, operations under cocaine anæsthesia, and operations for umbilical, ventral, and femoral hernia; also on allied subjects—hydrocele, varicocele, and castration. Much care has been taken to follow up the cases and learn the ultimate result, and by this method to obtain statistical proof of the value of the improvements in technique, the most important being excision of the veins of the cord, the substitution of silver wire for silk in the buried sutures, the use of rubber gloves by both operator and assistants, and the transplantation of the rectus muscle in cases in which the conjoined tendon is poorly developed or is obliterated. In summing up the results of operation for the radical cure of hernia, the author estimates the mortality as less than 5 per cent. Prevention of recurrence is assured in all femoral and in most ventral and umbilical hernias, and in more than 96 per cent. of the inguinal variety. The results have been exceptionally favorable in children, an experience coinciding with that of Bull and Coley, who employ the Bassini method. Coley, who disapproves of the Halsted method, has reported in one paper 160 operations for inguinal hernia by the Bassini method, with no recurrences, but his cases were not followed for the same length of time as these have been, and were largely among children. The problem offered by excision of the veins of the cord seems to have been one of the most difficult of solution. There is no doubt as to its value in preventing recurrence at least in this method, although its utility has been denied except when the veins are varicose, by the upholders of the Bassini operation, but the fact that it is followed in a large percentage of cases of epididymitis and in a small number by atrophy of the testicle is one the author has not been able to overlook. He himself states that the results of the experiments of Griffith on dogs have led him to believe that the function of the testicle may be destroyed by the ligation of the vessels of the cord without macroscopic atrophy, and advises, therefore, against excision of the veins on both sides in either hernia or varicocele, and adds that excision is contraindicated in children. The solution may be found in excision of the veins without transplantation of the cord or in transplantation of the veins alone. The use of rubber gloves in this, as in all operations, seems to be the most satisfactory means of avoiding the apparently impossible task of absolute sterilization of the human skin. The experience at Johns Hopkins with silver wire seems more fortunate than in many places where non-absorbable sutures have been used. It has certainly proved far superior to silk. Cushing's method of dealing with the undescended testicle by replacing it in the abdominal cavity is a brilliant device, and has yielded excellent results where employed; but as much cannot be said for disposal of the normal

organ in this manner, as it seems to have an unconquerable tendency to return to its natural site, and the results have been rather disastrous. The author's method of transplantation of the rectus muscle, when the conjoined tendon is too poorly developed to guard the lower portion of the opening, seems to be an excellent one so far as one can judge by the results at hand. He claims essential points of difference from Wolfler's method. There are some grounds for doubting the superiority of the incision in the groin for varicocele, which is recommended in place of the usual scrotal incision; the prospect of speedy primary union is tempting, but epididymitis and hydrocele seem to have been of frequent occurrence. A large portion of the volume is devoted to abstracts of the histories of all the cases. Handsome cuts, showing the stages of the typical operation, the method of transplantation of the rectus muscle, and the use of rubber gloves are included; also photographs of hernias before and after operation, of unusual size, etc. The thanks of the profession are due the author for his laborious efforts and scientific enthusiasm in compiling this important contribution to the literature, which will be of lasting value to all future investigators on this subject. J. H. J.

LEA'S SERIES OF POCKET TEXT-BOOKS. PRACTICE OF MEDICINE. A MANUAL FOR STUDENTS AND PRACTITIONERS. By GEORGE E. MALSBARY, M.D., Assistant to the Chair of Practice, Medical College of Ohio, University of Cincinnati, etc. Illustrated with 45 engravings. Philadelphia and New York: Lea Brothers & Co.

THE plan of this work is indicated by the fact that it includes within 388 pages a discussion of the subject of practice of medicine; but the purpose for which it is intended is admirably filled. It is written with great conciseness and yet clearly, and the main points of diseases are well brought out. There is enough attention given to etiology to give the student some conception of this portion of the subject, a praiseworthy feature which many manuals do not share with this one; and the etiological facts as given here, especially those relating to the infectious diseases, are well up to date. A manual becomes a dangerous thing if the student, or, more especially, the young practitioner uses it as his sole guide, as, unfortunately, so many do. When used to give a framework to which facts derived from broader collateral reading may be fixed, these small works have a valuable place, and this manual deserves decided commendation for such use. D. L. E.

PROGRESS

OF

MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Chronic Hyperplastic Perihepatitis. — CURSCHMANN was the first to differentiate this condition as a special disease, though as early as 1864 Bamberger described two cases of ascites which he attributed to a compression of the liver by a thick fibrous covering. A number of cases of this disease have been reported, among them the following interesting one by SCHMALTZ and WEBBER. The patient was a woman, aged forty-two years, and without a history of syphilis. The disease began in 1892 with enlargement of the abdomen, following a cold. At that time the patient was very anæmic, and had severe nose-bleed. In January, 1893, ascites was present, the legs were œdematous, and the liver markedly enlarged and sensitive, reaching within a hand-breadth of the pubes. The heart was enlarged, and a systolic murmur was audible over the entire præcordium. Considerable improvement followed the administration of potassium iodide. In January, 1894, the abdomen enlarged again, and the patient was tapped. Ten months passed before another operation was necessary, but after this the tappings were frequent and the amount of fluid removed large—as much as 13 litres. In the summer of 1895 the liver was hard and still large, the lower border being on a level with the navel. From November, 1895, the patient was confined to bed; death occurred in June, 1896. A definite diagnosis was not made during life. The great pain in the region of the liver at the beginning of the disease and its long duration—three and one-half years—suggested chronic perihepatitis. Post-mortem: The upper surface of the left lobe and parts of the right lobe of the liver were closely adherent to the diaphragm. The under surface of the liver was adherent to the peritoneum in front of the right kidney. There were short tendinous, thread-like growths between the under surface of the left lobe of the liver and contiguous parts of the

stomach. The liver on its non-adherent upper surface was covered with a fibrous, white, glistening, porcelain-like coat, resembling frosting. In places the clear, brown liver tissue could be seen. Its borders were markedly rounded, producing a cylindrical shape. Its consistency was slightly increased. The fibrous covering varied in thickness from 5 to 6 mm., and enveloped and strongly compressed the liver. The liver substance was normal, especially free from proliferation of connective tissue, the hyperplasia confining itself essentially to its peritoneal covering. It is important to note that there was no pericardial adhesion and no other severe cardiac disease to account for the alterations in the liver, so the condition was very different from that described by F. Pick under the name of pericardial pseudocirrhosis of the liver. It therefore seems impossible that the perihepatitis could be due to the irritation of a chronic congestion. The authors point out that in the early histories of many of the cases, as also in the one now reported, there was a great enlargement of the liver. They believe that at this time some causes of inflammation arrived in the peritoneum which were ineffective on the major part of that membrane, but on the abnormally tense serosa of the liver were able to set up a chronic inflammation. As a cause of the supposititious invasion there was in the present case an old appendicitis, while as the cause of a temporary congestion of the liver cardiac weakness from repeated hemorrhages seemed certain from the early history. It is a very striking fact that in all cases of this kind hitherto reported the portal radicles do not show the usual changes as they occur, for example, in ordinary cirrhosis. For this reason and on account of the continued ascites the authors believe that some other cause than portal obstruction must be present. This they find in the alteration of a large part of the peritoneum, especially that covering the diaphragm, believing that this must cause more obstruction to absorption from the peritoneum than inflammation in other parts of the abdomen. The clinical course in the present case corresponds with those previously reported, in the fact that after a certain time the disease seemed to become stationary, so that after thirteen punctures it was not necessary to tap again for ten months. The total course of three and one-fourth to four years was shorter than in many other cases, perhaps owing to the previous anæmia and weakness of the patient. Important points in the diagnosis are the acute beginning of the disease, its slow course, and the absence of all severe signs of portal obstruction.—*Deutsche med. Wochenschrift*, 1899, No. 12.

Myoidema in Pulmonary Tuberculosis.—WALSHAM (*The Lancet*, January 27, 1900, p. 230) has made some observations on the occurrence of "myoidema" in 1000 cases of pulmonary tuberculosis. If a point on the chest wall corresponding with the clavicular origin of the pectoralis major be struck in a patient with advanced tuberculosis the phenomenon known as "myoidema" will probably be observed. Myoidema may be divided into two varieties, viz., the fascicular and the nodular. The fascicular is most easily produced. At the point which is struck a sulcus is formed which quickly travels to the origin and insertion of the muscle, where it is lost. In the nodular variety there is formed at the point struck a small, quivering tumor which, after oscillating backward and forward, as if uncertain of its position,

for a second or two, finally comes to rest, and after a few seconds gradually fades away. If the point struck be watched, the initial pallor produced by the blow quickly gives way to redness, reminding one forcibly of tache cérébrale. Both these forms of myoidema may be obtained over other muscles besides the great pectoral.

The phenomenon is not a new one. It was first described by Dr. Stokes, of Dublin, in cases with pulmonary affections. The term "myoidema" was first made use of by a surgeon, the late Dr. Lawson Tait, who wrote a monograph on the subject in 1872. He believed the sign to be diagnostic of pulmonary tuberculosis. Dr. Samuel West had pointed out that the sign was not confined to cases of pulmonary tuberculosis, but showed that it also occurred in other wasting diseases. Jeanselme and Lermoyez claimed that the sign was a physiological phenomenon and could be obtained in healthy individuals. Walsham, however, states that he has never been able to obtain the phenomenon in healthy persons. Sir William Broadbent finds the sign almost always present in early phthisis, and Stokes claims that it is always most evident in the earlier periods.

With the object of settling some of these conflicting statements, Walsham observed 1000 cases of pulmonary tuberculosis, with special reference to this sign. He has never found it in an early case. It only becomes well marked when the wasting has advanced beyond a certain degree. The rule that the more marked the wasting the more marked is the myoidema has few exceptions. He could not confirm the statement made by some, that in unilateral phthisis the sign was confined to the affected side. In very advanced cases with great emaciation, Walsham has often failed to obtain the phenomenon, the pectoralis major apparently being too much wasted to produce it. He thinks that myoidema is nearly valueless as an early sign of pulmonary tuberculosis. It only becomes well marked when other physical signs leave no doubt about the diagnosis of pulmonary tuberculosis.

An Experimental Study in Gout.—FREUDWEILER (*Deutsches Archiv für klin. Med.*, Band lxiii. p. 266) has made an experimental study of gouty nodules, and finds that by the injection of sodium biurate a lesion can be produced which corresponds anatomically with that of true gout. The lesion does not appear to be the result of the action of a simple foreign body, but one due to the specific poisonous effect of the biurate. It is improbable that necrosis of tissue precedes the crystalline deposit, because the biurate alone is able to cause complete necrosis, and, on the other hand, crystals were found in tissues anatomically intact. The artificial biurate foci disappear in consequence of phagocytosis. The author finds no proof that the crystals are dissolved either physically or chemically, but does not deny such a possibility.

Observations Concerning Leukæmic Lesions of the Skin.—OERTEL (*The Journal of Experimental Medicine*, September-November, 1899, vol. iv. p. 369) has reported a case of leukæmia cutis, and draws attention to the rarity of the condition. The first case reported was that of Biesiadeckis, which was published in 1876. The cases of leukæmia of the skin which have been published up to the present may be divided into three classes:

The first class is represented by cases in which there are circumscribed, multiple, pin-head to hazelnut-sized, rapidly growing, pale or faintly red to brownish-colored tumors, irregularly distributed over the body, with little tendency to retrograde metamorphosis or ulceration.

The second class is characterized by a few solitary, brown, markedly elevated, lobulated, firm, slowly growing, and persistent nodules. According to Neuberger, the condition consists of a lymphoid-celled infiltration into the cutis, especially around the follicles, by which the deeper layers of the epidermis are compressed, although they are still separated from the infiltration in the lower part of the cutis by a small, narrow, non-infiltrated zone of connective tissue.

The third class includes those cases in which the lesions are more diffuse. They show, on the one hand, a diffuse, moist, eczematous appearance, especially of the head, extremities, and chest, and on the other hand, tumors the size of a pea to a pigeon's egg, which ulcerate spontaneously, leaving a large, flat, red ulcer. An eczematous condition of the skin is present.

The most definite statements yet recorded concerning the structure of leukæmic cutaneous nodules are to be found in Nékám's recent discussion of the subject. Without going into the histological details of the three above groups of cases, it is sufficient to say that Nékám is fully convinced that a number of the cases reported as examples of leukæmia cutis, and particularly the diffuse lesions falling under the third group, cannot be regarded as such, owing to the fact that neither the clinical nor the anatomical characters of leukæmia or of the tumors were indisputably established. He accepts as undoubted examples only the cases of Biesiadeckis, Hochsinger and Schiff, Neuberger, and his own, in all of which there were definite nodules the size of a pea to a hazelnut without a diffuse appearance.

After describing the histological features of the leukæmic nodules in the skin, Nékám states that they must be regarded as infiltrations, and we can, therefore, accept as such only those which fulfil the following conditions:

1. They must occur during the course of true leukæmia.

2. Their origin must be exclusively a diapedesis of cells from the blood, local proliferation of cells being absent.

3. A part of the cells, especially the red corpuscles, are returned to the blood by way of the lymph-channels, another part, especially the leucocytes, are carried off through the epidermis, or otherwise discharged.

4. The chief bulk of the cells composing the nodules undergo no metamorphosis.

The case which Oertel reports was a man, aged about forty years, who had been ill for two years. The attending physician had at first treated him for malaria, owing to the markedly enlarged spleen. Some time before the patient's death, according to the physician's statement, "there appeared on the skin small nodules, irregularly distributed over the body." They appear to have been observed first on the chest and arms, then on other parts of the body. Their appearance at once led to a diagnosis of multiple sarcoma of the skin. It was after this that Oertel first saw the patient. A blood examination was ordered, and a slide sent him for examination showed an enormous increase in the white corpuscles, with numerous myelocytes and eosinophiles. There remained no doubt but that the patient

was suffering from leukæmia. The case was not heard of again until weeks later, when Oertel was requested to make an autopsy. Only a partial autopsy was permitted, but he was able to obtain the spleen, a small piece of the liver, and two of the cutaneous nodules from the left thigh.

The sections of the nodules removed were stained in hæmatoxylin and eosin, the Biondi-Heidenhain mixture, and in Unna's methylene-blue. The epidermis and upper part of the cutis showed no definite changes. The lower part of the cutis, on the other hand, was the seat of a dense and diffuse so-called small-celled infiltration. The largest part of the infiltration was made up of cells presenting the characters of lymphocytes. These were of two kinds: (1) Small cells with narrow, faintly staining cytoplasm and deeply staining nucleus, and (2) larger cells with feebly staining cytoplasm and a large, sometimes indented, somewhat irregularly staining nucleus. There were found also (3) polymorphonuclear leucocytes and (4) eosinophilic leucocytes. Apparently no myelocytes were found. There were but few red blood-corpuscles and only an occasional plasma cell was found. No mitoses were observed, and in this regard Oertel's observations agree with Nékám's. Oertel states that his study of the nodules in this case goes to support the view of those who regard secondary leukæmic nodules as essentially composed of cells derived from the blood rather than from the local proliferation of cells.

A Contribution to the Study of Alcaptonuria.—A. E. GARROD (*Medico-chirurgical Transactions*, 1899, vol. lxxxii. p. 367) reports five new cases of alcaptonuria and gives a tabulated list of all the cases hitherto reported, making a total of thirty-one cases in all.

The urinary condition known as alcaptonuria was first described in 1859 by Bodeker, who suggested the name. The following are the essential features of the urine in alcaptonuria:

1. Although of normal appearance when passed, the urine rapidly acquires a deep brown color, and ultimately becomes black on exposure to air.
2. The brown color is greatly intensified by alkalines, its development being accompanied by oxygen.
3. The urine reduces Fehling's solution with the aid of heat, and actively reduces ammoniacal silver nitrate solution in the cold.
4. The bismuth test for sugar yields negative results (one recorded case alone offered an exception to this rule).
5. The urine has neither dextro-rotatory nor levo-rotatory power.
6. The fermentation test yields negative results.
7. Fabrics moistened with the urine become deeply stained on exposure to air.

From the thirty-one recorded cases alcaptonuria appears to be much commoner in males than females. There were twenty-three of the former and only eight of the latter. In the great majority of cases the anomaly dates from childhood. In seventeen of the cases it had been observed since infancy. Several members of a family may be affected. Kirk reported three cases in one family; all were brothers. Baumann and Wolkow have pointed out that lifelong alcaptonuria is apparently without any injurious effect upon the health of its subjects. The alcaptonuria may be intermittent.

The peculiar reactions in alcaptonuria have been attributed to various substances—pyrocatechin, uroleucinic acid, glycosuric acid, and homogentisinic acid. It is now generally conceded that homogentisinic acid is the cause of alcaptonuria in the vast majority if not in all cases. It was first isolated in 1891 from an alcapton urine by Wolkow and Baumann, and has the formula $C_8H_8O_4$.

Tyrosin is the parent substance from which the homogentisinic acid is formed. Wolkow and Baumann thought that alcaptonuria was due to a disturbance of the metabolism of tyrosin due to the presence of a special intestinal bacterium. Some opposition has been advanced against this view, however.

In four of his five cases Garrod isolated the lead salt of homogentisinic acid.

The Diagnosis of Typhoid Fever.—NAEGELI (*Correspondenz-Blatt für schweizer Aerzte*, 1899, No. 18) made use of an epidemic of typhoid fever in an almshouse to investigate the results of the serum diagnosis and blood examination. Some of his investigations are worthy of wider control. After considerable investigation the source of the epidemic was found in the dairyman of the institution, who, several weeks before the beginning of the epidemic, had an indisposition with diarrhœa, sweating toward evening, and disturbing dreams, but who did not consult a physician. Four months afterward he gave an intense Widal reaction, a dilution of 1 to 100 causing agglutination in fifteen minutes. In answer to a possible objection that the man could not have infected the inmates through the milk, because the milk would have been boiled, the author points out that in pouring milk from vessels for boiling small quantities are frequently left behind which are afterward mixed with the boiled milk and then consumed. In addition to this there are, of course, other possibilities. The author gives the results of his investigations in the leucocytes in typhoid fever, of which the following are worthy of consideration: He finds that the neutrophile cells decrease rapidly in the first stage of typhoid fever, soon reach the half of their usual number, and gradually further decrease up to the stage of defervescence. In the convalescence they begin to increase, at first slowly, and then rapidly. It is usually only after many weeks that the normal figures are regained. Before the onset of the fever there is probably a neutrophile leucocytosis. The author was not able to make blood counts in this stage, but found such an increase in the beginning of relapses. After this the relapse showed conditions similar to those described for the primary attack. Complications, such as parotitis, cystitis, otitis, suppurations and eruptions, often cause an increase of the neutrophiles before other clinical phenomena are manifest. The lymphocytes are much reduced in the first and second stages, increased at the end of the second or beginning of the third stage, soon pass the normal number, and reach the maximum long after the subsidence of the fever. The eosinophile cells decrease at once in the beginning of typhoid fever, and usually are completely absent in the first and second stages. Long before the defervescence, on the average a week before, the eosinophile cells reappear as a sign of good prognosis, and gradually increase, reaching the normal in the third week after defervescence. Sometimes, especially in children, they

long remain above normal. Relapses have the same effect as the primary attack, but complications, if not severe, usually do not influence the lymphocytes at all, and the eosinophiles very little. In children with typhoid fever the decrease of the total leucocytes is not so great as in adults, and does not last so long. The differential count is therefore important. By means of the leucocyte count and the serum test the author was able to recognize eight cases that would otherwise have been overlooked, including three in which there were no symptoms at all. From his own investigations he is inclined to consider the leucocyte count as at least equal in value to the serum test or in some cases even permitting a diagnosis where the serum test is negative.

A Contribution to the Subjects of Chronic Interstitial Nephritis and Arteritis in the Young, and Family Nephritis.—BRILL and LIBMAN (*The Journal of Experimental Medicine*, September and November, 1899) report an interesting case of chronic interstitial nephritis in a young girl, aged fourteen years, and draw attention to the fact that chronic nephritis, especially the interstitial type, is commoner in children than is generally supposed by the medical profession.

Of 251 cases of chronic nephritis observed by Heubner in Leipsic, 214 occurred in adults and 37 in children. He subsequently saw 28 cases in children in Berlin, mostly after scarlet fever. Of these 65 cases there were 3 of parenchymatous nephritis, 4 of contracted kidney, and 5 of chronic hemorrhagic nephritis. Bartelo has observed chronic interstitial nephritis in one case at the age of eighteen, in another at nineteen, and in two at twenty.

Heubner states that there are only thirty cases of interstitial nephritis in children on record in which post-mortem examinations have been made. He adds to his list four cases from his own experience; three are males, aged respectively fourteen, nine, and twenty-four, and one in a female aged eleven. According to Heubner, there are seven cases in the literature in which there is no history of a previous acute attack, so that they can be looked upon as instances of primarily contracted kidneys. The ages of five of these cases at death were five, six, ten, thirteen, and fourteen years respectively. Heubner had one case which belonged in this class, in a boy, aged nine years, who presented typical symptoms of chronic interstitial nephritis. Baginsky and Weigert have reported cases in which the interstitial nephritis was congenital.

Brill and Libman report a fatal case of chronic interstitial nephritis, with the pathological findings in a girl, aged fourteen years. The kidneys in this case were among the smallest that have been recorded in the chronic nephritis of early life. The right weighed 59 grammes and measured 9 x 4 x 3 cm. The left weighed 34½ grammes and measured 6½ x 3½ x 2½ cm. On microscopical examination both kidneys showed the characteristic changes of advanced chronic interstitial nephritis. The heart showed marked hypertrophy of the left ventricle. An interesting feature in this case was the extensive calcareous degeneration of the branches of the hepatic artery. This degeneration began apparently in the intima of the arteries, and later spread to involve the areas supplied by them. The deposit was

found to be calcium phosphate. A similar degeneration was found in some of the arteries in the kidneys. Large hemorrhages were found in the spleen and mesentery, and these had been suspected *intra vitam*.

In the absence of the usual etiological factors in this case, Brill and Libman thought that it might possibly be a case of so-called "family nephritis." Several observers have reported instances in which a number of the members of a family have suffered from nephritis. An inquiry into the patient's family history revealed that there was a "tendency" to the development of chronic interstitial nephritis in the three eldest children.

Brill and Libman summarize the main facts in this case as follows:

1. The occurrence of a very advanced primary chronic interstitial nephritis at the age of fourteen years.
2. Its presence in other members of the same family.
3. The extensive and marked arterial changes present.
4. The hemorrhagic diathesis and especially the occurrence of a large hemorrhage in the mesentery.
5. The occurrence of calcific deposits in the liver.
6. The case draws our attention again to the latency of some of these cases of chronic nephritis in children. There is no doubt that some of them have been regarded as instances of diabetes insipidus. The necessity of a careful and continued observation of the heart and vessels in such cases is apparent. Others are treated for a long time for anæmia without its cause being discovered. Still others do not present themselves for treatment until the fatal termination is close at hand, the patients having had no marked symptoms. The fact that chronic nephritis may run so latent a course and may occur at any age should lead us to pay as much attention to the examination of the urine of children as of adults.

SURGERY.

UNDER THE CHARGE OF

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A New Method of Treating General Peritonitis with Drainage in Cases of Diffuse Peritonitis.—BODE (*Cent. für Chir*, January 13, 1900) reports a new and thorough method of treating cases of diffuse peritonitis. He employs large quantities of normal sterile salt solution. The intestines are delivered *en masse*, and while they are covered with sterile towels soaked in hot sterile salt solution, the abdominal cavity is thoroughly scrubbed and

flushed. The intestines are then all carefully washed and any wounds sutured. When they are replaced, a drainage-tube having perforations in the middle is introduced, and the ends carried over the colon on either side and out through openings in both lumbar regions. Through these openings drainage-tubes are carried into the pelvis or any other portion of the abdomen that has been the seat of a focus of suppuration. Drainage is also inserted through the laparotomy wound as in ordinary methods. A peculiarity of the after-treatment is that the cavity is flushed out through these drainage-tubes in the daily dressings by means of large amounts of normal salt solution. When the symptoms of peritonitis subside, usually after three or four days, the tubes are withdrawn gradually and the wounds allowed to heal. The success of the treatment has been very marked, patients with very grave symptoms having recovered rapidly.

Local Anæsthesia in the Radical Cure of Hernia.—CUSHING (*Annals of Surgery*, January, 1900) reports that 233 herniotomies have been performed in Professor Halsted's clinic in the past two years, and that of these forty-nine were performed under regionary anæsthesia.

Almost all cases of hernia, with the possible exception of those in young children, could undoubtedly be subjected to the radical operation under similar local methods, but when a general anæsthetic can be safely administered, for various reasons it is much to be preferred by both patient and operator.

In the cases reported complete narcosis was contraindicated by advanced age, chronic bronchitis, and emphysema, tuberculosis, laryngeal or pulmonary, cardivascular changes of marked degree, chronic nephritis, and above all the shock and vomiting in strangulation. Besides these there have been about 200 cocaine operations of major character, where the use of a general anæsthetic was avoided for a similar reason. They included thirty laparotomies, exploratory sections; two gastrostomies; closure of a traumatic rupture of the jejunum; three cholecystotomies for empyema of the gall-bladder; three appendectomies, and one operation for the closure of a typhoid perforation. In handling the gut it was found that an anæsthetic was required, and no pain was produced unless traction was made excessive.

Local anæsthesia is particularly suitable for the ligation of varicose veins, suprapubic cystotomies, and all scrotal operations if done through the high incision.

The author gives a brief résumé of the case operated upon, and details the condition present and the result produced by the operation in some of the more important cases. In cases of strangulation, where the vomiting and shock from the absorbed toxins is great, the use of a general anæsthetic is contraindicated. He says: "It is in border-line cases of this sort that local anæsthesia gives the best chance of recovery. In just such cases do we often meet with death under or rapidly following the general anæsthetic."

He has carefully studied out the source and distribution of the cutaneous nerve supply of the operative area, both in dissections on the cadaver and by observations of the region of the cutaneous anæsthesia which results from such operations. Such knowledge is essential to the proper employment of the local anæsthetic in these or any operation.

Although not entering into the discussion of the merits of different local anæsthetic mixtures, he is well satisfied with Schleich's 1:1000 cocaine muriate mixture for infiltration anæsthesia. He has not found that the solutions of eucaine-B, suggested by Braun, have any advantage, while the duration of the eucaine anæsthesia is not quite as great. For anæsthetizing the individual nerve-trunks he employs a ½ to 1 per cent. sterilized solution of eucaine-B or cocaine, which is injected directly into the nerve.

The patients are prepared for operation by accustoming them to confinement in bed and getting them used to evacuating the bowels and passing the urine without getting up. A tenth or eighth grain of morphine is injected three-quarters of an hour before the operation, and repeated just before it is commenced. Its disadvantage is the confining of the bowels. The patients are often shaved and prepared on the table. The skin is infiltrated in the line of the incision. The tissue is found to be very vascular, and all bleeding is stopped, as it is essential to the dissection. It is unnecessary to anæsthetize the panniculus. Nerve fibres may be encountered in it, and veins that will cause pain if resected. The wound should be deepened to the aponeurosis at the upper angle near the external ring. The aponeurosis is then opened in the line of the fibres from the external ring, and the ilio-hypogastric and inguinal nerves immediately cocainized with a 1 per cent. solution. This produces anæsthesia of the whole lower operative field if the high incision is employed and the scrotum not opened. The ilio-inguinal and genital branches should be carefully displaced in the lower angle of the wound. The closure of the wound does not require any further anæsthesia. If the subcuticular silver suture is employed the skin edges will still be sufficiently anæsthetic to permit of its introduction. Sometimes a few inhalations of chloroform, not enough to produce unconsciousness, are necessary if the patient becomes very nervous or a sensory nerve fibre is cut. No post-cocainization pain has been complained of, while the infiltration has not interfered with primary union under one dressing generally in ten days.

The Surgical Aspects of the Modern Small-bore Projectile.—SCHACHUER (*Annals of Surgery*, January, 1900) derives the following conclusions from his study of this subject:

1. All advanced nations have practically the same character of rifle and projectile, and the remarks applying to one apply practically with equal force to all.

2. That the modern small-bore projectile is capable of producing wounds of both a humane and a gruesome nature.

3. The nature of the wound produced by the small-bore projectile is either dependent upon the intervening distance or the character of the structure wounded, or both.

4. The precise manner in which the explosive action is developed in structures filled with or rich in fluid is still *sub judice*.

5. The weight of evidence and the majority of authors favor the hydrodynamic rather than the hydraulic theory.

6. The new projectile is propelled with greater energy, velocity, and accuracy; it is lighter, has a smaller frontage, and is less liable to deformation on striking an object.

7. The new projectile has less "disabling capacity," and on the whole produces wounds of a more humane character than the old leaden bullets.

8. By explosive action is meant the damage created in structures outside of the projectile's path.

9. The explosive action depends upon the deformation of the projectile, the range, and the character of the tissue.

10. The shorter the range within the first 400 to 600 yards of the projectile's flight the more pronounced the explosive action.

11. At 800 or 1000 yards explosive action is occasionally met with, and then only in the skull or in parts of the body filled with and rich in moisture.

12. At a distance of 800 or 1200 yards the new projectile, as a rule, creates wounds with small orifices of entrance and exit, and little or no explosive action.

13. That the rotatory action of the projectile may continue after its penetrative movement ceases, and that the character of the wound is partially dependent upon this rotation.

Inflammation of the Costal Cartilage as a Sequela of Typhoid Fever.—LAMPE (*Deut. Zeit. für Chir.*, Band liii., Heft 5 and 6) concludes from his study of the clinical features and pathology of this condition that:

1. The inflammation of the cartilage originates in the cartilage itself. The perichondritis is secondary, although its clinical symptoms are the first to appear.

2. There are certain alterations in the cartilage which must proceed before infection can take place. They are due to age, and consist in vascularizations and the formation of sinuses or narrow cavities.

3. The treatment depends on the degree of inflammation; without suppuration an expectant treatment may be employed, but so soon as suppuration manifests itself the only treatment is operative. The excision of the entire costal cartilage is the only guarantee of cure.

Laceration of the Intestine with Rupture of the Mesenteric Artery Without a Skin Wound.—SHEPHERD (*Montreal Medical Journal*, July, 1899) reports a very rare case in which a traumatism produced a complete rupture of the small intestine without any external wound. The rectus abdominis muscle was, however, ruptured, the mesentery torn across, and with it the superior mesenteric artery near its origin. The patient's condition was very critical when he came to the hospital, and rapidly became worse. The operation was performed an hour after his admission. The abdomen was found filled with blood and intestinal contents, and, although the artery was secured and little blood was lost after the operation was commenced, the patient sank and died shortly afterward, although normal salt solutions were employed hypodermatically and the abdomen was filled with normal salt solution. Stimulant treatment was also employed. If the patient had recovered there would undoubtedly have been gangrene of a large part of the gut, and consequent death.

Internal or Direct Herniæ in the Female.—ESCHER (*Deut. Zeit. für Chir.*, 1899, Band liii., Heft 5 and 6) comments upon the rarity of these herniæ

as reported in literature or described by systemic writers. In 600 cases of inguinal herniæ which he has operated upon for the radical cure by Bassini's method there were forty-nine cases inguinal hernia in the female. Five of these cases were direct or internal herniæ. Of the 551 cases of herniæ in the male thirty-five were of the internal variety.

Of the five cases in the female, two were not examined to determine which variety of internal hernia they represented. In two of the cases the hernia originated in the fovea media and fovea interna, respectively, while a third was through the fovea interna.

The author believes that the difficulties that arise from the varying nomenclature of the herniæ could be avoided by designating them by the fovea on the peritoneal aspect, through which they make their exit. Thus the external oblique inguinal hernia would be termed hernia foveæ inguinalis externæ; the hernia inguinalis directa would be the hernia inguinalis foveæ mediæ, and the hernia inguinalis obliqua would be the hernia inguinalis foveæ internæ.

The Radical Cure of Inguinal Hernia in Infants.—FRAENKEL (*Cent. für Chir.*, November 25, 1899) holds that the indications for the radical operation are as strong in children, even nurslings, as they are in the adult. Recent research and clinical experience have shown that a great many of the herniæ seen in adult life are the result of the non-obliteration of the vaginal process of peritoneum—that is, the sac is already there, and the opening, which was closed by only slight adhesions, yields under sufficient stress. This is also the tendency of herniæ which have been cured by truss or pad in early life. In addition to the danger of recurrence there is the physical and psychic influence which the presence of such a disability always has upon the development of mind and body of the individual. The danger accompanying such an operation is no greater than in other operations of like character. Asepsis can be secured by appropriate dressings, fixing the limb on the side of operation and the employment of occlusive dressings about the rectum and penis. The results of the operations have been very satisfactory. Primary union was secured in the majority of cases in from eight to ten days. The effect on the digestive tract has been a marked improvement and an increase, as the result of operation is not to be feared, although any irregularity should be corrected as nearly as possible before the operation is undertaken.

The Radical Treatment of Umbilical Hernia.—PICCOLI (*Cent. für Chir.*, 1900, No. 2) calls attention to a new simple method of radical operation for this form of hernia, which is in a measure similar to the Bassini operation for inguinal hernia. It is based on the principle of replacing the linea alba by two overlapping layers of the muscular wall, thus transforming a linear scar having an antero-posterior direction, which is in the line of pressure, into a transverse, broad scar between the two overlapping surfaces, which is also a transverse plane to the line of pressure. This is the same principle as that evolved by MacEwen in his radical cure of inguinal hernia and amplified by Bassini in his latest modification of his radical operation.

In applying it to umbilical herniæ the author proceeds as follows: The

incision extends two or three inches above and below the hernia, according to its size. The hernia is reduced, the sac fastened with a Billroth clamp, resected, and the resulting wound closed by sutures. The peritoneum is carefully dissected up by the finger passed through the hernial opening as far as possible with the finger. The abdominal wall is then cut in the linea alba above and below, with the finger used as a director. The hernial opening is thus converted into an ellipsoid. Four or five sutures are now placed in the edge of the wound through the muscle and sheath of the rectus. They are knotted and the ends left long. These ends are carried separately beneath the muscle on the opposite side and penetrate it at a point about an inch from its free margin. The two ends come up through the muscle and its sheath at separate points. Strong traction is made upon them, thus forcing the edge of one rectus beneath the other. When all the sutures have been passed, tightened, and knotted in this manner an ellipsoidal overlapping of the two recti has been secured at the point of the hernial opening. The free edge of the rectus that has been penetrated by the sutures is now drawn over and secured by interrupted sutures to the sheath of the other muscle. The superficial fascia and skin are then united, completing the operation.

The author's clinical experience with this operation fully substantiates the result obtained in animal experimentation.

The Radical Operation in Crural Herniæ.—BRENNER (*Cent. fur Chir.*, November 4, 1899) calls attention to the fact that Salzer was the first to propose the closure of the crural ring by utilizing a crescentic flap formed from the pectineal fascia covering to the origin of the pectineus muscle. The flap is cut with its base attached to the os pubis, and is then turned over and sewed to Poupart's ligament. It is brought as close as possible to the internal border of the femoral vein.

The method of performing the operation is similar to that of other methods in isolating the sac, reducing the hernia and clearing the canal of all cellular tissue and glands. The sac is ligated, cut, and cauterized, when it generally retracts above Poupart's ligament. The pectineal fascia is seen glistening in the bottom of the wound after the removal of the tissue and glands. The flap is cut crescentic in shape. It has its convexity downward, which forms its free and inner border. Its base is thicker and attached to the os pubis. It is turned upward, so that the smooth surface covers the crural opening and attached by sutures to the middle portion of Poupart's ligament. A branch of the femoral artery and vein will often be found in the lower angle of the wound. No injury seems to be done by its section. It is not always essential to clear away the glands and connective tissue, and where possible they may be left. Sixty-three cases are reported with 91.8 per cent. of cures.

The Wisdom of Surgical Interference in Hæmatemesis and Melæna from Gastric and Duodenal Ulcer.—ARMSTRONG (*British Medical Journal*, October 21, 1899) reports two cases, one successful, one in which he operated, and one in which he assisted in the consultation, but in which he believed the patient was left too long before the operation was undertaken. This latter case leads him to the conclusion that operative interference is often

too long delayed. The results of the pathological and clinical study of the subject he expresses as his opinion that the following are suitable cases for intervention. He first, however, makes the following clinical division into classes: "Those in which occur frequently repeated small hemorrhages, and those in which the loss of blood is in large quantities; and it would seem that each class has a distinct pathological lesion, and this should be borne in mind in the consideration of the treatment of hæmatemesis, medically or surgically."

If, then, we can exclude aneurism, which should generally be possible, and leukæmia or cirrhosis or other cause of portal obstruction, he holds that the surgeon should interfere in those cases, first, of frequently repeated small hemorrhages which persist in spite of medical and dietetic treatment, and which threaten to destroy the life of the patient; and, secondly, in all cases of hemorrhage which, in spite of medical and dietetic treatment, recur. In these cases he advocates operation after the second hemorrhage. For hemorrhage occurring in cirrhosis and portal obstruction he does not think that the surgeon can accomplish any good. In these cases the hemorrhage is generally from a varicose œsophageal vein, a part difficult of access and secondary to a pathological lesion but little amenable to any form of treatment.

In cases of gastric and duodenal ulcer, however, the conditions are totally different. The lesion is primary and local, and in addition to securing the bleeding-point a more smooth and rapid convalescence is secured, the likelihood of perforation removed, and if found advisable the performance of a gastro-enterostomy or pyloroplasty secures to the stomach the rest which favors the healing of the ulcer and insures against subsequent occurrence of narrowing and obstruction at the pylorus.

The Radical Operation of Inguinal Hernia in Children.—KAREWSKI (*Cent. für Chir.*, 1899, No. 51), in discussing the subject, disagrees with Fraenkel, who holds that the Bassini operation is essential to the cure of the cases and that it is indicated in all cases. He does not believe that we have proof that all herniæ that have been cured by the truss are liable to be reproduced in later life, or that all herniæ are capable of being cured by the truss. He believes that many herniæ are cured by the wearing of a properly fitting truss, and that there are, on the other hand, many cases where the truss is not efficient and where the radical operation is indicated at an early age. The indications are the persistence of the hernia in spite of the truss; that it is not held up or the truss is not well borne where the hernia is irreducible or incarcerated. These are indications for operation in the nursling or in very young children. In older children the healing is less liable to occur from the application of a truss, and operation is therefore more frequently indicated.

The radical operation is not to be considered a perfectly harmless and dangerless operation, and should not be undertaken for the same reasons one would operate on a hare-lip. The simpler the operation the better. The author has found that the forcing of the sac by blunt dissection, its ligation and resection are sufficient to produce a radical cure, and that more complicated operations are not indicated.

PEDIATRICS.

UNDER THE CHARGE OF
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The Elimination of Mercury by the Mammary Gland.—E. SOMMA (*La Pediatria*, 1899, No. 6) has made careful analysis of the milk of seven women who were being treated either by inunction of mercurial ointment or with subcutaneous injections of a mercurial. The most delicate reagents were employed, but in none of the cases was the slightest trace of mercury found in the milk.

The author therefore concludes that the treatment of heredo-syphilitics by the milk of women submitted to mercurial inunctions or injections of mercury has no rational foundation in fact.

The Subcutaneous Injection of Salt Solution in Acute Diseases.—LENHARTZ (*Société Médicale de Hambourg*, in *Annales de Médecine et Chirurgie Infantiles*, September 1, 1899, p. 674) reports his observations on the use of subcutaneous injections of a physiological saline solution in the treatment of numerous acute diseases in childhood. The immediate effect of such injections is to raise blood pressure, and consequently to increase diuresis. Not only is the force of the heart improved, but, to use an expression of Sahli, there results a lavage of the whole organism, which is thus relieved of toxins. This treatment has given excellent results in typhoid fever, pneumonia, grave dysentery, peritonitis, ileus, cholera infantum, and summer diarrhœa. In certain cases all alimentation by the mouth or by the rectum was suspended, and for several days the patients were sustained entirely by the injections, which were given in quantities of ⅛ litre for adults or from 400 to 600 grammes for children.

In typhoid fever, notably, it was observed that the injection exercised not only a tonic action, but also was calmative, quieting both physical and mental agitation. A case of dysentery which had eighty to one hundred stools a day, losing from 1300 to 7500 c.c. of sanguinolent mucus, was cured by systematic injections of saline solution in dose of two litres a day. These results were due to the rapid elimination of toxins. The treatment is especially recommended in cases of grave peritonitis in which it is impossible to operate at once.

Among the unpleasant sequelæ of this procedure are subcutaneous abscesses, which are observed rarely in hospital and slightly more frequently in private practice, and acute dilatation of the right heart in nurslings. In three autopsies of infants Lenhartz observed slight œdema of the glottis, of which there had been no symptoms during life.

The number of blood-corpuscles and the proportion of hæmoglobin fail to show any notable increase in the volume of the blood. The excretion of the sodium chloride is quite rapid and the relatively high gravity of the urine at first shows that a large quantity of waste products is eliminated. The density of the urine later is reduced.

A Second Attack of Measles a Month after the First.—GAUCHER (*Société Médicale des Hôpitaux*, in *Annales de Médecine et Chirurgie Infantiles*, December 15, 1899, p. 913) observed a boy, aged ten years, attacked with measles on June 2, 1899, from which he had completely recovered by the 15th of the month. His mother, who had had measles during childhood, contracted the disease from him and showed the first signs of eruption on the 17th of June. On July 5th the boy again became ill, showed the characteristic prodromes, and had a more copious eruption than during the first attack.

Suffocative Laryngitis at the Beginning of Measles.—SEVESTRE and BONNUS (*Archives de Médecine des Enfants*, 1899, No. 2, p. 65) call attention to the fact that congestion of the laryngeal mucous membrane, while a natural and usually insignificant phase of the disease, may at times give rise to the gravest accidents. These serious symptoms, which occur at the beginning of the disease and even before the appearance of the rash, assume the form of laryngismus stridulus, or of a paroxysmal dyspnœa with persistent suprasternal retraction during the intervals. Three cases were observed in which the condition became so grave that intubation was demanded. Examination of the secretions of the throat showed the absence of Klebs-Löffler bacilli.

Pathology of Measles.—STEFFENS (*Deutsches Archiv f. klinische Medicin*, 1899, vol. lxii.) has made a clinical study of 322 patients coming under the care of Professor Jurgenssen in Tübingen, with reference to the following points: 1. The existence of an immunity to measles in young infants. 2. The state of the temperature during incubation and the prodromic stage. 3. The complications and sequelæ of the disease.

For the first category forty-one nurslings were observed, all less than three years old. Of these sixteen contracted the disease and twenty-five escaped; and of the latter none had reached the age of five months.

In the second inquiry the author obtained the temperature-curves of fifty-seven cases which subsequently developed measles. These could be divided into three groups. In the first, which embraced thirty-six cases, the temperature during incubation remained constantly normal, and the children in every respect seemed in good health. In the second group, which comprised eleven cases, the temperature was elevated slightly several times to 99.7° or 100.2°, the general condition remaining good. Finally, in the third group, which comprised ten cases, there were six in which the temperature rose to 102° to 104°. In the other four cases the elevation of temperature was evidently due to causes other than the incubation of measles. Whence the conclusion that in the majority of cases the period of incubation is without any symptoms either in elevation of temperature or in the general condition.

Of seventy-one children whose temperature was taken accurately during the prodromal stage, only two had a normal temperature the evening before the eruption appeared. With the others there were elevations of temperature, which in the majority of cases followed one of two types: either the temperature mounted quite high the first day, to descend to normal the following days, and rise again the evening before eruption; or the temperature mounted slowly and remained elevated. The duration of the prodromal stage in sixty-nine cases was from three to four and one-half days. Of the complications, bronchopneumonia occurred in 26 and otitis media in 4 of the 322 cases. In three instances other acute infections occurred (varicella, scarlatina, and acute pemphigus), and croupous pneumonia in five. Of the total number 10 died, 8 of capillary bronchitis, 1 of acute gastro-enteritis, and 1 of a general pneumococcic infection with pneumonia. The general mortality was therefore 3 per cent., while that of the bronchopneumonia cases was 30 per cent. It is noteworthy, however, that of the eight fatal cases of bronchopneumonia five children were rhachitic and one had pulmonary tuberculosis.

THERAPEUTICS.

UNDER THE CHARGE OF

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Drugs in Cardiac Insufficiency.—Dr. O. T. Osborne insists that it is useless to administer drugs by the stomach in acute cardiac insufficiency, for there is no absorption, even though vomiting is absent. Spontaneous "cure" may occur (1) if the patient has strong enough will-power to prevent nervous excitation. Mental irritation of the heart, with peripheral spasm of the bloodvessels, is avoided, and the heart again quiets down. (2) Exhaustion from respiratory effort, with cerebral hyperæmia, causes a dulling of mental-power and consequent removal of nervous excitation, thus the heart quiets down. Morphine, hypodermatically, is the best drug, but it may impair respiration, and death follows. Atropine should be added in small amount. Vaso-constriction requires nitroglycerin, not more than $\frac{1}{200}$ [?] of a grain, hypodermatically, or tablets on the tongue every fifteen minutes till frontal throbbing results. This, combined with a hot foot bath, will often obviate necessity for venesection. If following the primary acute insufficiency there is dilatation, œdema, and passive congestion, digitalis is indicated, the dose depending on the valvular lesion. In aortic lesions the pulse-rate should not be reduced below 80, and nitroglycerin is also given to diminish peripheral resistance. In mitral stenosis, slowing the heart to fifty or sixty beats is often of value. When digitalis is used (digitalin, $\frac{1}{100}$ to $\frac{1}{60}$ grain hypodermatically, being most active), and the heart greatly slowed, the patient must not rise from his prone position until profound effects have

passed off. With a full dose this does not occur for twelve hours. Cardiac exhaustion requires strychnine. The dose should be large, and not repeated within two hours. Camphor is best given in solution in olive oil, both drugs to be given hypodermatically. In marked cardiac weakness alcohol is dangerous (?), for it secondarily paralyzes the vascular system, increasing cardiac depression. By mouth, it reflexly stimulates the heart. Hypodermatically it should be used only in small quantities (?).

Compensation is best effected in chronic insufficiency by rest in bed and digitalis. When this drug is contraindicated, about fifteen minims of the fluid extract of cactus may be substituted. Cactus is not a vaso-constrictor; it prolongs the diastole, strengthening and steadying the heart. No nausea follows its use, nor does oliguria result. When the two drugs are combined less amounts of digitalis are required, and compensation lasts longer. Sparteine and caffeine are recommended for a change rather than for serious indications. Reduce or prohibit alcohol, tea and coffee. A weak heart without valvular lesion, if hemorrhage has occurred, is most benefited by saline infusion. Heat to the extremities and heart, with elevation of the feet and artificial respiration, are invaluable. Ammonia salts, strychnine, atropine and camphor are indicated. Digitalin also if the heart rallies and weakness recurs; also electricity. Digitalin is contraindicated in the true heart failure occurring in disease if the pulse is slow; champagne and black coffee are valuable. Chronic weak heart without valvular lesion requires strychnine, small doses of digitalis, and cactus. The irritable heart of chronic tobacco poisoning responds best to ample doses of strychnine or cactus, or small doses of digitalis.—*Medicine*, 1899, vol. v. p. 793.

Cinchonidine and Wrightia Antidysenterica; Prophylactics Against Dysentery and Malaria.—Mr. R. S. Ashe, experimenting with large gangs of prisoners during several months, concluded that cinchonidine sulphate reduces the prevalence of fever (malarial?), and that wrightia antidysenterica (inderjao) diminishes tendency to dysentery. He therefore placed the entire jail population on a prophylactic combination of cinchonidine sulphate and inderjao, of each five grains three times a week before the mid-day meal. Though intermittent fever still occurred, its severity was diminished, and the same applied to dysentery. Inderjao has no specific effect as a prophylactic for malarial fever, but its very great value in the prophylaxis of dysentery is certain.—*The Indian Medical Gazette*, 1899, vol. xxxiv. p. 313.

Quinine in Malaria.—Dr. George Dock objects to the expectant treatment of malaria, first, because of the destruction of erythrocytes, which, in even a mild attack, may be extensive. In a severe paroxysm more than one-fifth of all the blood-corpuscles in the body may be destroyed within two days, and, secondly, because there is no means of knowing whether a given attack will cease spontaneously or not. The severity of subsequent attacks is also an unknown quantity. Doses: Mild intermittent forms are checked by 5 or 10 grains given once. In general, 15 grains is the average. In severe æstivo-autumnal forms, 20 grains daily are required. To check growth, or kill the parasites, it is recommended to bring the greatest possible quantity of the remedy (quinine) consistent with safety in contact with

the parasite. As a rule, where the paroxysms are distinct, the whole amount should be given at once, or within two hours. The two methods of administration, the one where the drug is given several hours before the expected paroxysm (Golgi), and the other where quinine is given during the decline of the paroxysm (Sydenham). The writer's own experience shows more certain and more satisfactory results following the latter method. The chill does not always occupy the same place in the temperature-curve, but occurs at any time from the beginning to the end of the rise; inaccuracy results if the chill be used as a guide for the time of indication. Directions based on the chill are especially faulty in the more severe fevers; often there is no chill. Golgi's method involves two risks: 1. A primary paroxysm may be diagnosed as due to tertian fever, and while waiting for the time for a first dose of quinine a second paroxysm (due to a double infection) may occur. 2. The last dose, ordered five hours before the expected paroxysm, is useless in case the parasites are gone. Absorption from the stomach is less certain just before the paroxysm. Conclusions are: In tertian or quartan intermittent, singly or in combination, quinine is to be given during the decline of the paroxysm. A single dose is preferable, or several at short intervals. The hydrochlorate is recommended, followed by fifteen drops of dilute hydrochloric acid. Few patients require more than three doses. For its tonic effect not more than two grains thrice daily should be taken. In the æstivo-autumnal type, five to ten grains, according to the severity of the case, at intervals of about five hours until the temperature remits, then the daily intermittent dose until apyrexia. Relapses usually occur on the seventh day or some multiple of it. Quinine should be given at seven-day intervals in tertian fever. Prophylaxis is best accomplished by giving eight to fifteen grains weekly for six weeks, then slowly lessen the dose and lengthen the interval. Hæmoglobinuria and hæmaturia may be due to past attacks of malaria, as well as to active infection. If there is no evidence of active malaria (blood examination) quinine is not to be used. Quinine is often more or less irritating to the urinary tract. Large doses may aggravate local kidney disease and cause or increase hæmaturia. Pending further knowledge quinine can be used cautiously if parasites are present, giving the drug in an absorbable form, in moderate doses, and withdrawing it as soon as microscopical examination of the blood shows it no longer necessary. A temporary increase of hæmoglobinuria is not alarming, and not necessarily due to the drug.—*The Journal of the American Medical Association*, 1899, vol. xxxiii. p. 248.

A Substitute for Poultices.—Mr. M. I. Wilbert recommends as an improvement on and a general substitute for poultices a mixture of kaolin and glycerin. The formula is as follows: Kaolin, 1000; glycerin, 1000; boric acid, 100; oil of peppermint, 1; oil of wintergreen, 1; oil of eucalyptus, 2. The kaolin is sifted and heated to 212° F. for an hour or more, to sterilize; the glycerin is added and heat continued for thirty to forty minutes, the mass being occasionally stirred. When nearly cool add the remaining ingredients and mix thoroughly. To prevent absorption of moisture it should be preserved in air-tight receptacles. It has the advantage of being readily applied without boiling or other preparation, and of not requiring

renewal for from twelve to twenty-four hours, and of giving almost immediate relief from pain in most instances of acute or subacute inflammation or congestion. As a substitute for many ointments and cerates it has the advantage of not being greasy or dirty, and it can be readily washed off with cold water. It may be combined with such drugs as iodine, the various iodides, iodoform, tar and ichthyol.—*American Journal of Pharmacy*, 1899, No. 10, p. 478.

Tenalin.—Dr. F. Hobday has investigated this substance, which is a mixture of the alkaloids found in areca nuts, to-wit: arecain, arecaidin, and guavin, separated so much as is possible from the remaining alkaloid arecolin. Ascarides are vomited or removed in the feces. Tæniæ are expelled entire. The dose is one grain for each pound of weight (animals), but may be doubled if necessary. It should be administered per os, dissolved in one-half to one ounce of water. It is ineffective when given subcutaneously.—*Klinische-therapeutische Wochenschrift*, 1899, No. 37, S. 1186.

Antiphthisic Serum, I. R. (Fisch), in Tuberculosis.—Dr. A. M. Holmes reports fifty patients treated during twenty-one months, and divides them in two groups: 1. Early stage; no expectoration; nineteen patients. In thirteen the tuberculin test was tried, and reaction followed. Without exception every patient made rapid improvement under the serum treatment. At the close of treatment they failed to respond to tuberculin. Only one relapsed after improving, nine months of good health intervening. Treatment was resumed (five months) with subsequently no reaction to tuberculin. Has remained well. 2. Thirty-one patients. Eleven were in incipient stage, with expectoration and bacilli. Four were cured, bacilli entirely disappearing; five distinctly improved, but the serum was discontinued too soon. Two continue to improve. The twenty remaining patients were in an advanced stage. Four improved markedly; seven slightly. These latter subsequently failed again. Three were unimproved, and six died. One death was due to pneumonia of the sound lung. Many were treated for a short time only. Best results followed extended treatment. Where tuberculosis is advanced the serum may temporarily check its advance, prolonging life to some extent. The effects of serum administration are: 1. If the process is well advanced a rise of temperature follows after about four hours; 104° F. may be reached, but the temperature remains high only for a short time. 2. Extensive use of the serum causes a marked infiltration of the areas used for injection. There is no accompanying tenderness or pain. The subcutaneous tissue is infiltrated and binds down the skin. 3. Prolonged use produces depression, best relieved by short intervals of rest. Treatment is to be resumed with small doses. 4. In time the lymphatic glands become tender and enlarged—sometimes within three days. Usually this occurs after one week. Stress is laid on the inherent recuperative power of some patients. Where this is lacking treatment is of no avail. The tuberculin test has two advantages: 1. It is a safe and positive means of diagnosis when bacilli are not discoverable. 2. It is a reliable method of estimating the degree of convalescence. The effect of the serum on the blood count is invariably to increase the young lymphocytes in convalescence

(acting through stimulation of the lymphatic system [?]). Decrease is the rule in rapidly declining tuberculous patients.

Early diagnosis is insisted on, and the tuberculin test is recommended before treatment, diagnosis being doubtful, and the bacilli undiscovered.—*The Journal of the American Medical Association*, 1899, vol. xxxiii. p. 886.

Heated Blood in the Treatment of Croupous Pneumonia.—Dr. C. E. Elfstrom makes a third report of three patients thus treated. Diagnosis being established, a leech is applied (site not stated), and blood is drawn, diluted with salt solution, and heated to 140° F. during two hours; it is then subcutaneously injected. In a few hours all the symptoms improved, and recovery followed. In one instance, when the temperature began again to rise subsequently to a first injection; a second injection was given on the following day, and complete apyrexia rapidly followed. Of nine patients thus treated two have died; these had already developed signs of meningitis. If these be excluded, 100 is the percentage of cure.—*New York Medical Journal*, 1899, vol. lxx. p. 486.

The Treatment of Pertussis.—Dr. G. J. Kanheimer has obtained his more favorable results from the use of bromoform. Noting that the high specific gravity of the substance and the lack of settled practice among pharmacists in regard to dispensing by weight or measure, he prescribes it by drops. A fluidrachm contains four hundred and eighty drops; a drachm by weight one hundred and sixty drops. The dose is one drop for each year of age, given from three to five times a day, according to the severity of the disease and the effect produced. It is best given in syrup or mucilage of acacia or tragacanth, or with an emulsion of cod-liver oil, the latter being particularly adapted to debilitated children. The bottle should always be thoroughly shaken before administration of the dose.—*Pediatrics*, 1899, vol. viii. p. 431.

Antityphoid Serum in the Treatment of Enteric Fever.—Dr. I. R. J. Cowen reports a patient thus treated in a relapse. In the original attack salol and bismuth salicylate were used. When the serum was injected the patient was in the "typhoid state" with marked peritonitis. Forty-five minims of serum were used. The next day a drachm and three-quarters of serum were injected. The abdominal symptoms were improving rapidly. Four epileptiform convulsions occurred, followed by aphasia. Convulsions were repeated daily, gradually diminishing. Difficult articulation and mental torpor continued. Attention is called to a rise of temperature in each case within three hours after the serum injection, and the remarkable action of the serum in improving the general condition, with increase in bodily strength. The difficulty in speech and convulsions was probably due to a cerebral embolus, and not to the serum administration. The result seems to indicate that antityphoid serum possesses properties of an antitoxic as well as bactericidal nature.—*The Lancet*, 1899, No. 3968, p. 778.

Treatment of Acute General Septic Peritonitis by Continuous Irrigation with Warm Normal Salt Solution.—Dr. Ernest Laplace concludes that this may prove to be a valuable aid in the treatment of heretofore fatal

instances of peritonitis. To his knowledge it has not been used before the single instance reported. He concludes: 1. That the peritoneal cavity stands, with perfect safety, a continuous irrigation with normal salt-solution at a temperature of 100° F. during seventy-four hours. 2. The infection may entirely cease, together with pain, vomiting, and distention. 3. The irrigation was comfortable, and no complaints were made. 4. The copious irrigation, it is believed, dissolved and carried off the toxins as they were formed; it reached the more dependent portions of the peritoneal cavity, and removed infectious material; therefore, effectual drainage was established. It acted as a tonic to the heart; some was doubtless absorbed into the system. During three days the infection was held in abeyance by the antiseptic action of the salt, and phagocytosis had free scope to destroy permanently the infectious bacteria. The irrigation was carried out through an incision in the abdominal wall.—*Treatment*, 1899, vol. iii. p. 510.

A Grave Infection Treated by Artificial Serum.—Dr. M. A. Balvay reports that in a patient suffering from some severe general infection of unknown character, but somewhat resembling typhoid fever, cure was effected, where medication had signally failed, by the subcutaneous injection of a drachm and a quarter of sodium chloride and a drachm and three-quarters of sodium phosphate to about one quart of water. Within a week more than three quarts were injected. The treatment was not begun until after the fiftieth day of the disease. Following the first injection the patient was more comfortable and able to sleep soundly. No grave inflammatory reaction followed at the site of injection, though great feebleness of health had preceded the immediate disease. Effects of injection were: Subjective cold, frequent shivering for some hours, great diaphoresis and diuresis, diarrhœa and sialorrhœa. Cure apparently resulted from the very great stimulation of the various emunctories, notably the kidneys. A true "lavage" of the blood occurred.—*Lyon Médicale*, 1899, tome xci. p. 469.

Ethyl Bromide an Anæsthetic in Minor Surgery.—Dr. J. E. Kempter makes a plea for a more extensive use of this drug, on the ground of its comparative safety, quoting German statistics to show that of 60,000 patients thus anæsthetized there were but sixteen deaths. Ethyl bromide is prepared by decomposing potassium bromide with ether in the presence of alcohol. Cardiac depression follows only when anæsthesia is prolonged or an impure preparation is used. Its main advantage is rapid anæsthesia. Heart lesions do not contraindicate its judicious use. Brief operations, such as tonsillotomy, are satisfactorily performed. In an ether cone two to three drachms are poured (one to two drachms for children), and the administration is like that of ether, no admixture of air being permitted. The cone is not removed until full anæsthesia is induced, and this is recognized by cessation of struggling. Usually one minute produces deep anæsthesia, which lasts one, rarely two, minutes. Nausea and vomiting are rare. Neither heart-beat nor pulse is influenced, as a rule. Corneal reflex is present, with primary mydriasis. Cyanosis is uncommon. The patient awakes suddenly, the mind is clear. Headache, somnolence, and amaurosis are after-effects sometimes noted. Ethyl bromide is volatile and liable to decomposition.

The inhaler should be at once applied. A fresh preparation is requisite. Exposure to light or air results in compounds more toxic than ethyl bromide. The adult anæsthetic dose must not exceed three drachms. When pure the drug is a colorless liquid, non-inflammable, with an ethereal odor and hot, saccharine taste.—*Maryland Medical Journal*, 1899, vol. xlii. p. 133.

Salt Water Infusion in Acute Disease.—Dr. Lenhartz makes use of subcutaneous salt water infusions in typhoid fever, acute infectious pneumonia, severe dysentery, peritonitis, perityphlitis, and ecphyaditis. Marked diuresis, with a lowering of the specific gravity of the urine, follows, and this indicates a washing-out of the tissues. The quantity used varies from a quart for adults to three or five ounces for children. It is better to begin with small quantities in order to avoid over-distention of the heart.

Dr. Jolane considers this method dangerous in pneumonia, but found it excellent in hysterical vomiting.

Dr. Rumpf found it excellent in uræmia when used in conjunction with blood-letting, but obtained negative results in diabetes, besides incurring the danger of gangrene.

Dr Reiche, in contrast with the above-cited criticism, has obtained good results in pneumonia, believing that the danger is to be guarded against in the kidneys and other parenchymatous organs rather than in the heart.—*Therapeutische Monatshefte*, 1899, Heft 8, S. 441.

A Case of Colocynth Poisoning.—An improvised tincture of an entire colocynth "apple" in four ounces of gin was swallowed as an abortifacient. One hour later there were faintness, vomiting, and epigastric pain. A watery, large, blood-tinged stool followed, and a little later a convulsion. Temperature normal, pulse 62, weak and irregular. Patient was frequently delirious. Emesis occurred about thirty times in the first twenty-four hours. There were two convulsions and four blood-stained stools. Next day extreme prostration and epigastric pain were noted, and ten evacuations from the bowels; also three attacks of vomiting. Prostration and epigastric pain marked. For five days the dejecta numbered at least nine daily, and were regularly blood-tinged. No febrile movement. Treatment: Morph. sulph. a quarter grain, and atropine sulphate one hundred and fiftieth of a grain, hypodermatically, twice on first and second days, once on third day; also bismuth subnitrate, cocaine hydrochlorate, and lime-water in mixture (amounts not stated) for three days. Thereafter bismuth subnitrate alone was given every three hours in fifteen-grain doses. Fomentations to epigastrium and abdomen gave much relief. Forty grains of colocynth have proved fatal, and recovery has followed the taking of three drachms. In this instance between three and four drachms were swallowed. Apart from the intense gastro-enteritis, the main toxic effects were depression of the circulatory and central nervous systems. Abortion did not result.—*New York Medical Journal*, 1899, vol. lxx. p. 343.

Poisoning by Sulphonal or Trional.—Dr. Horatio C. Wood, Jr., states that chronic sulphonal poisoning has become of late so comparatively frequent that only too many physicians know the symptoms of this fatal intoxi-

cation from experience. The first signs are so unsuggestive that they are often not noted, the diagnosis not being made until the patient's death-warrant is read in the blood-red urine. There are, for example, complaints of nausea, of general lassitude and weakness; nearly always there is also disturbance of the bowels, either slight serous diarrhœa or obstinate constipation, preceding the outbreak of the pathogenic symptoms. None of these conditions occurs in a neurasthenic woman—which class furnishes the large majority of instances of poisoning and attract the attention of the physician. In the advanced stages the symptoms are more uniform; colicky pains about the epigastrium, vomiting and absolute constipation, which hardly yields to the most severe measures. There are manifestations of grave changes in the nervous system; the sense of weakness becomes, perhaps, an absolute paralysis, occasionally more or less general, but more commonly limited to small groups of muscles. Almost always there is marked ataxia of both arms and legs. Finally, to render the diagnosis beyond doubt, we have the port-wine urine, due to the presence of hæmatoporphyrin, probably a derivative of hæmatin, of high acidity, and later albuminous. The symptoms of trional poisoning resemble those caused by sulphonal, but with certain differences. These are: Premonitory symptoms due to nervous changes—headache, very commonly giddiness, staggering gait; and paralysis, even to loss of control of sphincters, and almost complete loss of power of motion. A slight watery diarrhœa may change abruptly into constipation. The most important point in the treatment of poisoning from either substance lies in the prophylaxis. Of twenty instances of sulphonal poisoning, seventeen had a fatal termination; of nine from trional, three died. Twenty-six of the twenty-nine were women, and a considerable proportion were not under the close observation of the physician. An important precaution is to prevent the accumulation of the poison in the body. Interruption in the use of the remedies should be at least for one week, and the intestinal canal should be thoroughly cleansed out, so that no undissolved remnant of the drug is left. The poison must be stopped at the first appearance of toxic symptoms, and the bowels promptly emptied. Since the urine is likely to be highly acid, sodium bicarbonate or magnesium carbonate may be employed; the former may be combined with sodium sulphate. Large amounts of water should be introduced into the circulation, both by the intestinal tract and by the subdermal tissues, in order to aid in the elimination of the poison. The convalescence is likely to be very slow, often lasting several months.—*Merck's Archives*, 1899, No. 11, p. 460.

[About two years ago we called attention elsewhere to the dangers arising from prolonged administration of these drugs. The ease with which patients can obtain hypnotics for self-administration, and the slight importance which they attach to their use, may lead the physician to overlook the premonitory symptoms until the patient is found in a critical condition. Inquiry should be made as to these facts of all patients, and especially of women who present the symptom-complex of neurasthenia.—R. W. W.]

Treatment of Cardiac Asthenia of Pneumonia.—Dr. H. L. Elsner lays emphasis on the fact that in addition to cardiac weakness there is also paralysis of the vasomotor system and dilatation of the peripheral vessels, particu-

larly the arteries. He considers the cardiac asthenia due to a toxæmia, causing, in addition to vasomotor and right heart paralysis, degenerative changes in the muscle and heart clots. In addition there is obstruction in the pulmonary circuit. Arguing from these premises, he objects strongly to the use of all remedies that reduce vitality; cardiac depressants, except cold, are contraindicated. Nitroglycerin is especially to be avoided, as it increases vasomotor paralysis; the drug may occasionally be of service in contracted arteries, usually seen where intestinal nephritis is a complication.

If the right heart is overtaxed and dilated, venesection is a far more rational treatment. Veratrum viride is placed in the same category as nitroglycerin. Digitalis and strychnine are both powerful stimulants to the vasomotor centres, and meet the conditions admirably. Hypodermatic administration is of great importance. Rather large doses of both drugs are recommended. Diffusible stimulants are invaluable to counteract the cardiac asthenia itself. Their evanescent action can be overcome by repetition at short intervals. Another dose must follow before the effect of the preceding dose has vanished. The writer recommends: Compound spirit of ether, aromatic spirit of ammonia, compound spirit of lavender, fifteen drops of each. To these is added tincture of valerian (same amount), producing a "quieting" (?) effect, when given in these small doses with the above stimulants. Sometimes the mixture cannot be retained when valerian is present, and whiskey or brandy is substituted in equal dose. Where the Hoffmann's anodyne is distasteful it can be omitted, and the dose of the ammonia and lavender is doubled. Spartein sulphate in quarter-grain doses with caffein, four to six grains, is given every two to four hours. Tokay wine is recommended as by far the best alcoholic stimulant, dose, a tablespoonful every half-hour, and given with the ethereal stimulant when due. Sometimes high rectal injections of coffee and whiskey, with hypodermatic injections of ether and oil (?), are indicated to tide over periods of collapse. Oxygen is mentioned, but without enthusiam. To carry out this treatment skilled assistants are absolutely requisite. No statistics are given, but the statement is made that patients have been saved in whom a favorable result was not anticipated. —*The Therapeutic Gazette*, vol. xxii., No. 6, p. 361.

Dionin.—Dr. Paul Hein prescribes this remedy in doses varying from one-third to one-half a grain, either in powder with sodium bicarbonate solution in cherry laurel water, or suppository of cocoa butter. He finds this morphine derivative midway in action between codeine and morphine, and very serviceable as an anodyne, hypnotic and sedative. Untoward symptoms may arise in patients whose myocardium is diseased, but rarely even in this condition. It seems to be quite as prompt in action when given by the rectum as by the mouth.—*Klinische-therapeutische Wochenschrift*, 1899, No. 46, S. 1482.

Therapeutic Uses of Iodopyrin.—Dr. Junkers states that in fifteen-grain doses this remedy lowers the temperature in various forms of typhoid fever and in pulmonary tuberculosis In the latter seven-grain doses, given at night, produce normal temperature, conduce to sleep, and do not give rise to phenomena of collapse. In puerperal fever it reduces the temper-

ature, the patients feel better, and sleep ensues. That the iodine of this combination may act as a disinfectant is suggested when the fact that in a 1 : 10,000 solution it possesses antiseptic action upon septic blood. In muscular rheumatism fifteen-grain doses often cure within three days. In acute articular rheumatism pain is relieved, mobility is increased, and only rarely has sodium salicylate been, of necessity, resorted to. Over the latter it has the advantage of not producing unpleasant symptoms. In gout eight observations show that it relieves pain. In epidemic influenza the headache and other pains rapidly yield to its influence, while the sequelæ, as bronchial catarrh, are more rarely complained of. It may even be employed as a prophylactic. Various neuralgias are benefited; ischias so much that morphine is unnecessary. Intercostal and facial neuralgias are often benefited by fifteen-grain doses. Dysmenorrhœa may be successfully treated by this remedy introduced in a suppository. So-called bronchial asthma is relieved as to the air-hunger, difficult respiration and tenacious expectoration.—*Therapeutische Monatshefte*, 1899, Heft 11, S. 604.

"Wood Pulp." A Substitute for Flaxseed in Poultices.—Mr. Fred. I. Gordon recommends crude unbleached sheets of wood pulp. A piece of suitable size is soaked in hot water until thoroughly soft, and lightly wrung out and applied to the skin of the patient. This material absorbs four times its weight of water. No cloths are needed. Cooking, stirring and spreading are dispensed with. Oiled muslin externally will aid in retaining the heat and moisture. None of the antiseptics is incompatible with wood pulp, and by soaking the latter in solutions antiseptic dressings can be made. To sterilize a dry sheet requires three minutes in a hot oven. For foul ulcers where charcoal is indicated, char one side of sheet for a quarter of an inch, scrape lightly, and apply a deodorant and absorbent dressing. When dry, wood pulp absorbs melted ointments and oils; thus menthol, thymol, etc., dissolved in an oil, are absorbed, and a clean salve results. The pulp makes, when scraped and moulded, excellent tampons and suppositories. Thick sheets, if soaked, can be moulded as splints; on drying, the shape is retained, they become stiff, and serve as excellent splints. Plaster-of-Paris sprinkled between thin sheets adds to their strength. Soaked in ice-water, a serviceable ice-cap is made, which, being moulded to the head, will not fall off. When cotton or lint is lacking, scraping a sheet of pulp and sterilizing the fluffy mass in a stove gives an excellent substitute. When a "jacket poultice" is required (pneumonia), sheets an inch thick should be used and covered with oiled muslin to retain heat. The sheets of wood-pulp are very light and easily transported.—*American Journal of Pharmacy*, 1899, vol. lxxi., No. 11, p. 525.

The Treatment of Bronchopneumonia in Children.—Dr. D. A. Hodghead, from a study of twenty-five cases, reports very favorably on the use of calomel and belladonna. Other medication is stopped, poultices removed, the child is wrapped in soft, loose clothing, and water is substituted temporarily for milk. The room is to be kept at an even temperature, and the atmosphere is not surcharged with moisture. Calomel in one-tenth of a grain doses is given every hour until a free movement of the bowels is ob-

tained, and, alternating half-hourly with the calomel, two drops of the tincture of belladonna. As improvement begins the belladonna is reduced to drop doses hourly. The temperature falls, respirations become less rapid and are deeper, rattling and large râles disappear; the moist râles become few and feeble; pulse and cough improve, and the patient can sleep and take nourishment. In the patient whose case is specially cited, belladonna rash became well marked, after which the drug was gradually withdrawn. Calomel is of value as a cathartic, even early in the disease, but the belladonna is not effective until the disease is well established, when the early, dry, congested state of the bronchi has given place to the superabundant mucus and mucopurulent secretion. Ammonia combinations liquefy and tend to increase the amount of secretion; belladonna diminishes them, stimulates respiration, thus aiding elimination. A child under five years expectorates but little. An advantage in this method of treatment is the discarding of steam-tent, ice-pack, etc. Both drugs suggested above are well borne by children. With the belladonna treatment the mortality has not been over 5 per cent., like results being obtained in three London hospitals, whereas by the older methods mortality averages 60 to 80 per cent.—*The Pacific Medical Journal*, 1899, vol. xlii., No. 6, p. 326.

On the Treatment of Abdominal Palpitations.—Dr. W. Wade believes that in this condition, whatever may be the state of the somatic circulation, the abdominal aorta and probably other arteries are in a state of high tension. Small doses of nitroglycerin are usually sufficient to control the palpitations by lowering the tension in the splanchnic area. One two-hundredth of a grain is often an ample dose. By thus equalizing the circulation, miscellaneous accompanying symptoms disappear. The radial pulse becomes more full and forcible as more blood is liberated from the splanchnic area. Like treatment is also recommended for cold extremities, being due often not to insufficient heart-action but to local contraction of arterioles.—*The British Medical Journal*, 1899, No. 2007, p. 1451.

Treatment and Medical Complications of Typhoid Fever.—Dr. H. A. Hare suggests the following modifications in the hydrotherapy of typhoid fever. The necessary friction and massage are not to be overlooked. The water is to be *varied* in temperature according to the persistency and degree of the fever. Seventy degrees is cold enough for patients who do not react well and have only moderate pyrexia; later, ice-water may be used. If the fever is high, ice rubbed over the surface of the body is substituted for the bath. The dose of cold varies with the needs of the individual. Properly carried out, the temperature can thus be reduced many degrees, producing a good reaction, showing that it is unnecessary to exhaust the patient by the actual plunge bath. Great confidence is expressed in the value of the active rubbing accompanying the sponging, thus aiding the reaction and increasing the loss of heat 80 per cent. (Popischil) and the loss of moisture through the skin by half (Weisrock). In the early stages of the disease the fever is most resistant to the cold sponging with friction, and this is equally true of the plunge itself. There are certain patients who do not respond to the

sponging and frictions, and these are best treated by the cold plunge bath as ordinarily used.—*The American Medical Quarterly*, 1899, No. 1, p. 4.

The Injection of Saline Solutions.—Dr. E. Houèl concludes that it is not only in diseases which are self-limited that such injections are of value, but also in such conditions as septicæmia, uræmia, dysentery, etc. The action of saline injections is to eliminate the toxic substances by a "lavage" of the cells paralyzed by the poison, to increase phagocytosis, to increase the urine, to stimulate the nervous system. The main object of the injections is the "hæmatocatharsis," and consequent clearing of the system of its toxins—*Revue de Thérapeutique*, 1899, No. 12, p. 401.

GYNECOLOGY.

UNDER THE CHARGE OF

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Freund's Operation for Cystocele.—Wertheimer (*Centralblatt für Gynäkologie*, 1899, No. 40) describes a modification of Freund's operation which consists in making a transverse incision in the anterior vaginal wall in front of the portio, so that the uterus can be drawn downward. The usual denudation is then made and its upper edges are united to the uterus. Menstruation is not interfered with, but in order to prevent conception the tubes are resected (?).

Ileus after Laparotomy.—Werth (*Ibid.*) reports eleven cases of intestinal obstruction in one thousand abdominal sections, with six deaths. In two cases the abdomen was reopened and adhesions separated with success. In nine enterostomy was performed, with three recoveries.

In the majority of cases ileus is due to slight local obstruction with general paralysis of the gut above the site. Enterostomy offers a better prospect of recovery than reopening of the abdomen, on account of the serious condition of the patient.

Although sepsis is often the cause of ileus, it may occur after a perfectly aseptic operation from mechanical injury to the serous covering of the gut. The latter may be avoided by the adoption of Trendelenburg's posture, by making a small incision close to the symphysis, and protecting the intestines as much as possible while removing the tumor. Dangerous adhesions are most apt to occur in the neighborhood of the abdominal wound, at the stump, and in Douglas' pouch. These are prevented by carefully suturing all raw surfaces in the parietal peritoneum near the edges of the wound, by covering the stump with peritoneum, and by temporarily excluding the coils of intestine from Douglas' pouch, by over-distending the bladder. If the bladder is filled with sterilized boric acid solution during the operation, the

additional advantage is gained of causing the patient to urinate spontaneously afterward. The writer is opposed to the use of purgatives before operation, believing that they are more likely to cause subsequent atony of the intestine. He prefers phosphate of codeine to morphine, as it is less likely to hinder peristalsis.

Complete Prolapse of the Uterus in the Virgin.—STEPKOWSKI (*Revue de Gyn. et de Chir. Abdom.*, 1898, No. 5) in reporting a case of procidentia in a young woman due to prolonged coughing and the carrying of heavy burdens, refers to Neugebauer's statistics, in which only seven cases of complete prolapse are noted among 28,000 cases, or 1 in 4000.

Peritoneal Adhesions.—GERSUNY (*Archiv. für klin. Chir.*, Band lix. Heft 1) describes a case in which an adhesion was found at the beginning of the sigmoid flexure, extending across the outer layer of the mesocolon. It was not recognized until the colon was drawn toward the median line. The clinical symptoms were constant pain in the lower part of the abdomen, violent pains in the left side before defecation, chronic constipation and tenderness over the appendicial region, as well as at a corresponding point on the left side.

The writer states that he has operated upon twenty-one cases of a simi'ar character, and believes that adhesions at the sigmoid flexure are not rare, but are readily overlooked because they are often complicated by appendicitis and pelvic disease. Hemorrhages into the peritoneal cavity are doubtless responsible for the formation of adhesions. Such hemorrhages may be due to injuries or to the rupture of Graafian follicles and the escape of blood from the tubes. Possibly some cases of appendicitis may be secondary to adhesions thus produced. The treatment is surgical abdominal section and separation of the pseudomembranes.

Operations for Prolapse of the Uterus.—V. HERFF (*Centralblatt für Gynäkologie*, 1899, No. 41) was able to trace 253 out of 283 cases of prolapse treated at the Halle clinic between 1894 and 1898. The usual operations were amputation of the cervix, with anterior and posterior colporrhaphy, often supplemented by vaginofixation or vesicofixation. Ventrofixation was only employed after other methods had failed, or when it was necessary to open the abdomen for other purposes. Hysterectomy was confined to the most obstinate cases. Freund's operation was not successful.

Cases were regarded as cured only when no prolapse of the vaginal walls was noted on severe straining. Of the lighter cases 50 per cent. were cured, while in 15 per cent. of the bad cases the patients were able to perform their usual work. Relative cures were obtained in 78 per cent. after vaginofixation or vesicofixation, and in 77 per cent. after both plastic operations and ventrofixations. Subsequent labors caused the greatest number of recurrences (28.9 per cent.). Cystocele returned most frequently, less often prolapse of the uterus, and rectocele least frequently of all.

The principal cause of failure is relaxation of the tissues—a factor which cannot be eliminated, although they may be strengthened by gymnastics. Imperfect restoration of the pelvic floor, non-union, and fresh lacerations

which are not properly repaired are also responsible. The writer regards a firm perineum and a narrow vaginal outlet as most essential to a permanent cure.

Intraperitoneal Infusion of Saline Solution.—EICHEL (*Archiv für klin. Chirurgie*, Band lviii. Heft 1) adopts the following plan of gradually introducing saline solution into the peritoneal cavity after severe operations: Before closing the wound a No. 18 catheter is inserted at the lower angle and carried down into Douglas' pouch. The wound is sutured in the usual manner, and the catheter is cut off and its end secured with a wire suture and attached to a glass irrigator. After the dressings have been applied a continuous flow of saline solution is begun and maintained for twenty-four hours at the rate of one cubic centimetre a minute. This is effected by compressing the supply-tube with a clamp fitted with a millimetre screw. About three pints of fluid are introduced in twenty-four hours.

A case of rupture of the liver, with profuse hemorrhage, is cited, in which three quarts of saline solution were injected into the peritoneal cavity in two days, the patient making a good recovery without any other stimulation. It was estimated that fully two quarts of blood were lost.

The Mobility of Tumors.—PAGENSTECHER (*Deutsche Zeitschrift für Chirurgie*, Band l., Heft 1 and 2) conducted a series of experiments on the cadaver, using a rubber ball which he sutured at different points within the abdominal cavity. He infers that cysts of the mesentery are quite movable, and may descend even into the true pelvis. Floating kidneys and spleens, and even gastric tumors, may have the same range of motions. Mesenteric tumors, however, are more superficial, and when at rest are situated in the middle of the abdomen at one side of the umbilicus. A movable kidney gravitates toward the lumbar region when the patient assumes the dorsal position, but sinks downward in the erect posture, lying behind the intestines.

Foreign Bodies in the Abdominal Cavity.—BUSHBECK (*Centralblatt für Gynäkologie*, 1899, No. 45), in a paper on this subject read before the Dresden Gynecological Society, reports a case in which a gauze pad was retained in the peritoneal cavity for two and one-half years after operation, being discharged through a fistula in the abdominal wall, which communicated with the intestine. A perfect cure followed resection of eight inches of the gut. In the discussion which followed cases were reported by Leopold and Meinert.

Papillary Tumors of the Fallopian Tube.—MACREZ (*La Gynécologie*, October 15, 1899), in an elaborate paper on this subject, in which he analyzed all the reported cases, presents an interesting résumé of the pathological anatomy of these growths, which he divides into three classes, viz., papilloma, adenoma, and epithelioma. The first two varieties are often found in the same specimen, when the neoplasm is properly called adenopapilloma. It is possible that the true papillomatous form may represent an early stage, the adenomatous being a later development. The benign growth may undergo epitheliomatous degeneration.

There are no definite signs of benign papilloma of the tube unless the frequency of so-called *hydrops tubæ profluens* and ascites may be regarded as possible indications.

In the evolution of papilloma the initial stage is probably a simple salpingitis. In consequence of this lesion papillary formations develop, the epithelial cells of which secrete an irritating fluid which is not an inflammatory exudate. Adenoma develops subsequently, while epithelioma of the tube is to be regarded not as a primary neoplasm, but as the last stage in the process of evolution.

As regards the prognosis, the age of the patient and the extension of the disease point to malignant degeneration. The presence of a hydrosalpinx with a profuse watery discharge from the vagina, and ascites furnish a clear indication for immediate operation, since the tendency of papillomata to become malignant is undoubted.

Pathology of Uterine Fibromyoma.—TRIDONDAIN (*Archivio Italiano d'Gin.*, June 30, 1899) believes that fibromyomata develop from the muscular fibres in the walls of the small uterine arteries, which are found in the zone of elastic tissue which surrounds the fibrous nodule. The latter is neither the result of a local irritation, nor is it the product of congenital inclusion, but is an expression of abnormal activity in the entire genital system, which has its most striking manifestation in the uterus.

Myxomatous Degeneration of Fibroids.—JOUSSELIN (Paris Thesis: *La Gynécologie*, October 15, 1899) rejects this designation of mucoid degeneration as incorrect, since the condition is really due to the secretion of a colloid material by the embryonic cells of the tumor. He suggests "colloid infiltration" as being more exact.

This change usually occurs in fibroid tumors after the climacteric, and is not indicated by any clinical symptom when it begins in the centre of the neoplasm. If general, it may lead to a rapid enlargement of the tumor, with resulting compression symptoms and to profuse hemorrhages. It may be impossible to distinguish colloid infiltration from malignant degeneration. Colloid cystoma of the ovary may readily be mistaken for it.

Recurrence after Vaginal Hysterectomy for Cancer of the Uterus.—OLENINE (Paris Thesis: *La Gynécologie*, October 15, 1899) calls attention to the fact that while 420 patients with cancer of the uterus were treated at the Kasan clinic between 1886 and 1897, only fifty-four cases were suitable for operation, and of these but thirty-three were really favorable. Seven patients died from the operation. Of the remaining forty-seven, thirty-seven were traced; twenty patients were free from recurrence, eight being well at the end of six years. The writer thinks that these results are quite encouraging, since over 50 per cent. of the patients showed no evidences of a return of the disease.

Modification of Hegar's Method of Colporrhaphy.—BLANKOFF (Paris Thesis: *La Gynécologie*, October 15, 1899) describes the following method suggested by Schwartz: The same surface is denuded on the posterior vaginal

wall as in Hegar's operation. Catgut sutures are passed not transversely as usual, but parallel to the long axis of the vagina. The sutures include almost the entire thickness of the rectal wall, so that when tied the rectocele is entirely obliterated. The object of the operation is to furnish to the pelvic floor the maximum power of resistance.

The Effect of Amputation of the Cervix Uteri on Pregnancy and Labor.—CHALEIX-VIRIE (Paris Thesis: *La Gynécologie*, October 15, 1899) reports seventeen cases of amputation of the cervix in which the subsequent history of the patients was obtained. Pregnancy occurred twenty-three times, with nineteen deliveries at term. Full dilatation of the cervix varied from three to nine hours. Seventeen children were born spontaneously, forceps being used only once. No children died. In all cases a thorough excision was performed according to Schroeder's method. The writer concludes (contrary to Pinard's view) that the operation has absolutely no harmful influence upon subsequent pregnancy and parturition.

Influence of Diabetes on the Female Genital Organs.—DANCKWORTH (Inaugural Thesis; abstract in *Centralblatt für Gynäkologie*, 1899, No. 23), from a study of the records of the Halle clinic, finds that pruritus vulva is the initial symptom of diabetes in about 20 per cent. of the cases. Premature menopause is relatively common in diabetics, which may be due to degeneration of the nerves of the genital tract in consequence of impaired general nutrition. Endometritis is often present.

Marriage should be forbidden to diabetic women, in consequence of the deleterious influence of pregnancy and the puerperium.

Lipomyoma of the Uterus.—BRÜNINGS (*Ibid.*) reports the case of a patient, aged fifty-five years, from whom he removed a fibromyoma the size of a child's head. Microscopical examination showed that the tumor was partly transformed into fat in consequence of degeneration of the muscular tissue. The muscle cells contained large vacuoles filled with fat globules. In many places the protoplasm was much swollen, the cell having several nuclei. The same condition existed as in progressive muscular atrophy.

Influence of the Menopause on Cardiac Lesions.—HOSTKIEWITZ (*Archives russe de pathologie; La Gynécologie*, April 15, 1899) arrives at the following conclusions as the result of observations extending over five years. In certain women the menopause is attended with functional cardiac neuroses; if these are added to pre-existing organic lesions the result may be fatal. Asystole is one of the most important results of these neuroses. Patients with arterial sclerosis, without valvular lesions, resist the climacteric disturbances best, while those with disease of the pulmonary or mitral valves are most affected. Dilatation of the cavities of the heart, or of the aorta, tachycardia and arhythmia in women at the climacteric do not bear a direct relation to the degree of arterial sclerosis. Aggravation of the cardiac symptoms is observed at intervals corresponding to the menstrual periods, with corresponding periods of amelioration, but the attacks may become more severe and prolonged until they terminate fatally. If menstruation reappears there is

usually a distinct improvement in the symptoms. In general, the disturbed mental and physical condition of the patient at the time of the menopause exercises an important influence upon the cardiac neuroses of this period.

OBSTETRICS.

UNDER THE CHARGE OF

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Treatment of Fever Following Delivery.—At the last meeting of the British Medical Association, SPENCER opened a discussion upon this subject.

He divides puerperal fevers into four classes. The first is that occurring about the third day, the temperature rising to 102° F. and yielding promptly to the administration of a purgative. Where emotional causes are present the temperature may be much higher, but promptly subsides.

In the second class of puerperal fevers he places those caused by diseases having no connection with labor. Such are influenza, scarlatina, acute tubercular infection and typhoid. Influenza is, in his opinion, more frequently diagnosticated than actually found in the puerperal condition. In some cases, however, this condition is undoubtedly present. Scarlatina is very rare in the puerperal period, and most cases so diagnosticated are septic, with an anomalous rash. Acute phthisis is often mistaken in the puerperal period for pneumonia, as the physical signs correspond. It does not yield to treatment, and the discovery of the bacillus establishes the diagnosis. In typhoid the differential diagnosis may be difficult, and can often be established by the use of the Widal test.

In the third class of fevers Spencer places infection from pre-existing lesions, such as ovarian and fibroid tumors, cancer, stone in the bladder or ureter, pyosalpinx, and appendicitis. Patients giving a suspicious history should be thoroughly examined during pregnancy, and the complicating lesion removed, if possible. These cases require operation of some sort in almost every instance.

The fourth class of fevers is due to external infection, and is seen clinically in three forms. The first is acute septicæmia, which terminates fatally within a few days. The second is lymphatic septicæmia, the usual form beginning with a chill; this extends into the peritoneum; the third is pyæmia or venous septicæmia, characterized by a succession of chills and by the formation of abscesses. The placental site usually sloughs in these cases.

Mild cases of puerperal sapræmia or poisoning by the chemical products of micro-organisms are often seen, and usually result in recovery.

As regards the treatment of these conditions, he urges the routine exami-

nation of every patient toward the end of pregnancy. In this way not only is the size of the pelvis ascertained, but also the presence or absence of complicating lesions. Vaginal examinations are made less frequent, and the chances of infection are much diminished. The third stage of labor must also be carefully conducted, and the womb should be left clean and empty. He draws attention to disinfection of the hands, for which he prefers bichloride of mercury, and urges the disinfection of the vulva in every case.

When septic infection is present the uterus should be examined as soon as possible. The interior should be thoroughly explored and all retained material at once removed. The operator should use rubber gloves, thus avoiding danger to himself and to other patients. Care should be taken that no violent effort be made to empty a septic uterus. Only that tissue should be removed which has become partially loosened by pathological processes. The uterus should be washed out by a glass tube. When the peritoneum is involved Spencer has waited until the fluid became localized, and then has opened the collection through the abdominal wall or Douglas' pouch. The uterus should be removed when it is the site of carcinoma or contains a fibroid which cannot be enucleated. He strongly deprecates the use of antipyretics, but prescribes stimulants freely. He is not inclined to favor the use of antistreptococcic serum.—*British Medical Journal*, October 14, 1899.

The Influence of Rest or Work Upon the Development of the Fœtus in Utero.—In the *Revue Pratique d'Obstétrique et de Pediatrie*, 1899, No. 135, BACHIMONT gives the results of his observations regarding the effect which rest or active labor has upon the fœtus *in utero*. His general conclusions are that the weight of a child born after the mother has had two or three months' quiet and freedom from toil is at last 340 grammes greater than the weight of a child born of a mother who has worked actively up to the time of labor. The writer made an investigation in 225 cases of twin pregnancy occurring at the Baudelocque Clinic in Paris with reference to the point in question. He found that 112 of these patients had rest during the latter part of pregnancy, forty-nine had not. In fifty-three no history was given, and in eleven some pathological condition complicated the pregnancy.

Among those cases in which the mother had rest there was but one child stillborn. The majority of the children distinctly exceeded in weight the average child.

Among the 104 children in whose case no history of rest was obtainable, seven were stillborn, showing a great increase in mortality over the first group of cases.

A further study of these cases shows that the women who had opportunities for rest before labor had a longer pregnancy than those who had not. Thus their average duration of gestation was 269 days, while in the case of the others it was 247 days.

Rupture of the Uterus at Full Term; Missed Labor; Delivery Nine Weeks Later.—CAMERON (*British Medical Journal*, October 14, 1899) reports the case of a multipara who at full term had severe labor pains with profuse discharge of water. She had a bloody discharge, and her attendant

reported that the womb was partly dilated. She remained in this condition for about two weeks, when she was seized with acute pain in the left side and general enlargement of the abdomen. Her labor pains ceased, and she lay in bed for three weeks unable to rise. She was visited regularly by her medical attendant, an uneducated practitioner. She finally left her bed and walked about a mile, but the next day there was bleeding, and another physician was summoned. He found a round tumor on the left side of the abdomen. On internal examination there was great difficulty in reaching the os, but a hard, smooth, round body was felt lower down. Later on, under chloroform, the os was dilated and the child's head found with the parietal bones approximated. Version was performed and the child delivered. The physician could not, however, find the placenta nor the uterine wall. The child's head was greatly flattened. It had been dead for some time and was soft, but showed no sign of decomposition. The umbilical cord was ruptured close to the abdomen, and there was no trace of a fresh separation of the cord. Cameron was summoned two days later, and on examination passed the hand through the vagina into the abdomen, and brought down the cord and traced it to the placenta, attached at the right iliac region. The woman died three days after delivery.

This remarkable case illustrates the tolerance of the abdomen to the dead fœtus when septic infection does not occur.

The Diagnosis and Treatment of Suppurative Inflammation in the Eyes of the New-born.—In the *Centralblatt für Gynäkologie*, 1899, No. 41, AMMON gives the results of his clinical studies upon this question. He has found the incubation period of gonorrhœal ophthalmia to be at the longest three days. He believes that most cases of ophthalmia in the new-born arise from lack of cleanliness on the part of parents and nurses.

He has observed many severe cases in which gonococci were not present. Among these was infection by the pneumococcus, causing a violent conjunctivitis which suddenly subsided in four or five days. In ill-nourished children staphylococci can set up very severe and dangerous inflammation. The use of nitrate of silver is by no means successful in all cases, and predisposes to late infection through its effect upon the cells of the conjunctivæ. He is not in favor of allowing ignorant persons to use silver solution, and believes that this custom has resulted in the spread of ophthalmia.

In treating these cases he believes that weak solutions of protargol are best, and he has seen good results by irrigating the eyes twice daily with sterile salt solution, making applications of ice every three minutes. Cases of corneal ulceration have done especially well under this treatment. He is accustomed to smear the lids with vaseline and to tie the hands of the child. He is much opposed to any plan of treatment which requires the use of irritating substances in the eye. In the later stages of the case he uses protargol in 10 and 20 per cent. solutions, and after three weeks often employs sulphate of zinc.

Cramer in a paper upon the same subject stated that he could not distinguish clinically between gonorrhœal ophthalmia and that which does not result from gonorrhœa. He has found pneumococci, the colon bacteria, streptococci, staphylococci and the diphtheria bacillus as causes of this in-

flammation. In some instances he has seen this complication follow infection by the bacteria contained in the lochial discharge. In cases of pneumonia the mother's sputum may convey the germ. Infection may occur in labor through the partial opening of the lids. He believes that if the eyes are not irrigated bacteria seldom do harm. When, however, silver has been used, he considers bacteria increased thereby, and the conditions made favorable for a secondary infection. He prefers other disinfectants than silver. He has employed protargol in 20 per cent. solution with good results.

In the discussion of this paper several expressed their belief that the use of silver predisposes to later infection of the conjunctivæ.

Labor Complicated by Posterior Rotation of the Chin Terminated Successfully by Forceps.—In the *Transactions of the London Obstetrical Society*, 1899, vol. lxi. p. 280, LEWERS describes his success in the delivery of a patient who was in labor with a face presentation of the fœtus. The chin was directed backward and to the right. The os was fully dilated and the membranes had been ruptured for some time. The ordinary forceps had failed in delivery. Axis traction forceps was then applied, the head grasped securely, and traction made in the axis of the pelvis. The chin rotated forward, and the child was delivered. It was apparently stillborn, but was revived by artificial respiration, and subsequently did well. Facial paralysis persisted for some weeks, but ultimately disappeared.

This is the second case in which Lewers has succeeded in delivering a patient with axis traction forceps when the chin had rotated posteriorly.

Antero-posterior Positions of the Head as a Cause of Difficult Labor.—MCKERRON (*Transactions of the Obstetrical Society of London*, 1899, vol. xli. p. 142) reports two cases in which antero-posterior position of the head complicated labor.

The first was a multipara, slender in stature, and below the average height. Her previous labors had been hard, most of them requiring the use of forceps. When the patient was seen in labor the pains were diminishing in strength and in frequency, and the patient complained of exhaustion. The head was movable above the brim, the occiput anterior. The posterior fontanelle could be felt clear of the anterior lip of the os and near the symphysis, the sagittal suture running directly backward. Chloroform was administered, and traction made with the forceps, but without success. The forceps threatened to slip, and accordingly were removed and a more thorough examination made. The head seemed of normal size. The anterior fontanelle was just above the promontory of the sacrum. It was evident that the head was in an antero-posterior position, with its long axis presenting in the antero-posterior diameter of the pelvic brim. As descent was impossible in that position, the occiput was rotated slightly backward, so as to bring the head in the oblique diameter of the pelvic brim, when the head with moderate traction passed into the pelvis, and the patient was readily delivered. The child died three days afterward, and no autopsy could be obtained. The mother recovered. The examination of her pelvis showed it to be symmetrically contracted.

In the second case the patient was a multipara, a robust woman, at the

end of the first stage of labor. The head was freely movable above the brim, but the membranes ruptured during examination. Strong pains came on, but the head remained above the brim, and but little pressure was exerted upon the cervix. The head was in an antero-posterior position, and descent was impossible. The occiput was cautiously rotated slightly backward to bring the head in an oblique diameter, and labor was easily terminated by forceps. The child apparently did well, but died suddenly on the third day.

At autopsy the subdural space was distended with blood, which had gravitated to the base of the cranial cavity and into the subdural space of the spinal cord. The lateral ventricles contained serous fluid. There was no fracture of any of the cranial bones, and the source of bleeding could not be traced to any one vessel.

An effort was made to measure the internal conjugate by the hand during the labor, and it was thought to be 8 cm. The external measurements of the pelvis showed it to be symmetrically contracted and of a moderate degree of contraction.

DERMATOLOGY.

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Multiple Epithelioma Developing upon Lupus Erythematosus.—PRINGLE (*British Journal of Dermatology*, January, 1900) reports the following case: A woman, aged thirty-six years, came under observation in March, 1890, presenting an active erythematous lupus of the nose, temples, cheeks, chin, and scalp, this last region being affected to an unusual extent, the greater portion of the scalp being transformed into scar tissue. Seven years later she again came under observation, presenting at this time two nodular growths upon the scalp typically epitheliomatous in appearance. These growths were excised. During the following two years fresh epitheliomatous manifestations appeared. Microscopical examinations of these growths showed them to be squamous epithelioma.

The Alterations of the Skin Occurring in Lymphatic Leukæmia and in Pseudoleukæmia.—PINKUS (*Archiv für Dermatologie und Syphilis*, Band l., Heft 2) concludes a paper upon this subject as follows: The tumor-like localizations occurring in the skin in lymphatic leukæmia cannot be distinguished from those occurring in pseudoleukæmia; they are clinically and histologically identical. The cases of so-called mycosic erythrodermia stand in close relation to the leukæmic skin localizations, which are not to be

reckoned as belonging to mycosis fungoides, but as belonging to the lymphodermia perniciosa of Kaposi. These form a group which is characterized by erythrodermia (an eczema-like condition with redness, swelling, itching), the occasional occurrence of marked thickening of the skin, and in some cases actual tumor formation, and the coexistence of lymphocythæmia. The diagnosis of such cases can only be definitely made after the appearance of the skin and lymph-gland tumors. Histologically the leukæmic skin tumors consist of a collection of lymphocytes in the corium and subcutaneous tissue, which, at the site of the tumors, arises from previously normally present lymphatic tissue, and not from lymphocytes supplied by the blood-vessels. It is in a certain sense a lymphatic granulation tumor.

The Etiology of Ecthyma Gangrænosum.—HITSCHMANN and KREIBICH (*Archiv für Dermatologie und Syphilis*, Band l., Heft 1) report a third case of ecthyma gangrænosum. The patient was a greatly emaciated infant, six weeks old. Over the buttocks, the thighs, the abdomen, and in the popliteal spaces were twenty-five to thirty lesions, varying in size from a lentil to a small coin, covered with necrotic detritus. Some of these lesions exhibited a central depression. Microscopical examination of the lesions revealed the presence of a bacillus, which cultures proved to be the bacillus pyocyaneus. From the three cases studied by the authors they conclude that the bacillus pyocyaneus is the exciting cause of this affection, which occurs in highly cachectic children, and is characterized by the appearance of red-brown or dark-brown discolorations of the skin, usually surrounded by a halo. The centre of these efflorescences speedily becomes necrotic.

A Case of Chronic Interstitial Nephritis in which Dermatitis Exfoliativa Supervened.—DUCKWORTH (*British Journal of Dermatology*, January, 1900) reports the case of a woman, aged fifty-nine years, who, after having been ill five months, developed a rash all over the body "like measles." This disappeared in two days' time, and was followed by desquamation. Two or three months later she suffered from a universal dermatitis, the skin being dry and harsh, and covered with thin, white scales lying on an erythematous base. Behind the ears were some small moist eczematous patches, and the scalp was covered with fine scales. The entire surface was tender to pressure. The eyelids were puffy, and there was œdema of the feet and legs. The urine was acid and contained albumin. After a time the patient became drowsy, the urine scanty, and death from uræmia followed. The author regards the appearance of albuminuria in the exfoliative dermatitis of elderly people as an unfavorable factor, and the occurrence of ordinary eczema over large areas in elderly subjects with chronic nephritis is of evil omen. Inunction with pure olive oil is the best local treatment.

A Case of Blastomycetic Dermatitis Engrafted on Syphilitic Ulcers—ANTHONY and HERZOG (*Journal of Cutaneous and Genito-urinary Diseases*, January, 1900) report the following case: A man, aged forty-four years, presented numerous ulcerative lesions upon the foot and leg, many of them being covered with fungous granulations projecting a considerable distance above the surface of the sound skin. These ulcers followed an erysipelas of

the leg, which had occurred some twenty years previously, and from the time of their first appearance the leg had never been freed from ulceration. A diagnosis of syphilis was made; but, with the view of investigating the possibility of the vegetating character of the ulcers being due to a subsequent blastomycetic infection, a microscopical examination of some of the lesions was made. The histological changes found corresponded with those described as characteristic of blastomycetic dermatitis, and numerous blastomycetes were found.

Anæsthetic Prurigo as a Symptom of Alcoholic Intoxication.—GASTOU (*Annales de Dermatologie et de Syphiligraphie*, 1899, No. 11), at a séance of the Société Francaise de Dermatologie et de Syphiligraphie, called attention to a form of prurigo symptomatic of chronic alcoholic intoxication. There is violent pruritus, much more severe at night, accompanied by restlessness and insomnia. The papular elements of prurigo are present in almost all cases, but in varying degree; in some the lesions are few in number, and but slightly excoriated; in others they present the type of prurigo ferox. Under the influence of external irritants the lesions may undergo various modifications; eczema-like patches may be produced, or patches resembling ringworm; or lichenification may occur, or suppuration having the appearance of a grouped folliculitis or an impetigo. In addition to this pruritus there is a diffuse, irregular anæsthesia occurring in patches. This anæsthesia is profound, follows the pruriginous elements, and is localized in the pruriginous areas.

A Case of Erytheme Indure des Scrofuleux of Bazin.—C. S. DADE (*Journal of Cutaneous and Genito-urinary Diseases*, July, 1899) reports a case of this rather rare disease (with two photographs), and concludes, from the histological and bacteriological findings, that the disease is not entitled to be regarded as tuberculous, and thinks that it should be regarded as a simple subacute inflammatory manifestation, keeping the title "erythema induratum," but dropping "of the scrofulous." The disease in this case, as in many others that have been observed, had much in common with erythema nodosum, but nevertheless differed from it.

[Audry, in the *Annales de Dermatologie et de Syphiligraphie*, 1898, came to the same conclusion as Dade, that it was not scrofulous, but seemed to be rather a chronic form of erythema nodosum.]

A Case of Sclerema Neonatorum.—PRINGLE (*British Journal of Dermatology*, July, 1899) reports in brief a case of this disease occurring in a male child, aged six weeks. The child was born in a hospital, and nothing abnormal was observed concerning the skin until the child was two weeks old. There were two symmetrical bands of deeply infiltrated and nodulated skin lying longitudinally over both deltoid regions. They stood out boldly above the general surface, and were of faint, purplish tint. There was also an extensive area of scleremato us skin of more usual type over the lower dorsal and lumbar regions, which (in the opinion of the reporter) established the diagnosis.

[The case has apparently more in common with morphœa than with sclerema neonatorum.]

Psoriasis and Glycosuria.—NAGELSCHMIDT (*Berliner klinische Wochenschrift*, January 8, 1900; *Journal of the American Medical Association*, February 10, 1900), after reviewing the reported cases of psoriasis associated with diabetes, describes in detail a case of Senator's: A woman, aged thirty-two years, who, with psoriasis since childhood, died from diabetic coma. In eight out of twenty-five cases of psoriasis Nagelschmidt succeeded in inducing alimentary glycosuria, while in a number of cases of other cutaneous diseases this was impossible. He concludes that there must be some connection between psoriasis and diabetes under certain circumstances.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Bacteriological Study of the Bile.—FRÄNKEL and KRAUSE (*Zeitschrift f. Hygiene*, 1899, xxxii. 97) give the results of the bacteriological examination of the bile in 130 cases—128 of them at autopsy, 2 at operation. Of these, 105 were sterile, 25 were not. Of the 25, 12 were cases of cholelithiasis, 4 acute infectious diseases, 4 cases of peritonitis, 3 abdominal operations. In 2 the diagnosis was indefinite.

Of the entire number, 36 were cases of tuberculosis; 34 of these were sterile by the ordinary method of examination. Of these 34, the bile from 11 was inoculated into guinea-pigs. Five of the pigs became tuberculous.

Their method of making cultures was to ligate the bile duct, remove the gall-bladder, wash in running water, let stand in corrosive sublimate solution (5 to 1000) for three minutes, then in sterile water a few minutes, dry with a sterile towel, singe an area with a Bunsen flame, and open with sterile scissors, catching the bile in a sterile test-tube. Plates of glycerin agar were made from this, three attempts being made if the first and second were sterile. Cultures of the typhoid bacillus, bacillus prodigiosus, and streptococcus were injected into gall-bladders which subsequently received the same treatment. This was done to prove that the sublimate does not injure by diffusion. Fifteen of the cases were also cultivated anaërobically. The time of autopsy was from one to forty hours after death; most of them were less than twenty-four hours.

They then investigated human bile as a culture medium for pathogenic bacteria. Their method was to inoculate a tube containing 1 to 10 c.c. of sterile bile with an organism and make daily glycerin agar plates from this. They conclude that for the typhoid bacillus, colon bacillus, bacillus pyo-

cyaneus, staphylococcus pyogenes aureus, and the spirillum of Asiatic cholera, bile is a good culture medium. The diphtheria bacillus and the streptococcus developed very slightly, while the streptococcus lanceolatus develops scarcely at all.

Cultures of the typhoid and diphtheria bacilli in bile were more rapidly fatal to guinea-pigs than cultures in bouillon. As control to this observation they first inoculated guinea-pigs intraperitoneally with sterile bile, with no fatal results and with no disturbance of health unless the quantity was large; second, in a series of rabbits and guinea-pigs they performed laparotomy, cut the gall-bladder, let bile into the peritoneal cavity, then stitched up the bladder and abdominal wall, with perfect recovery, without symptoms where asepsis was practised. A later autopsy showed only adhesions about the seat of the operation.

Changes in the Liver-cell in Jaundice.—Szubinski (*Ziegler's Beiträge*, 1899, xxvi. 446) reviews the work of Fleischl, Kufferath, Harley, Nauwerck and others with reference to the manner in which the bile reaches the blood in cases of jaundice. These men have demonstrated by animal experimentation: 1. That bile acids are found in the lymph from the thoracic duct shortly after ligation of the common bile duct. 2. That if the common bile duct and thoracic duct are ligated simultaneously jaundice is prevented, but only for a time; jaundice appearing in all cases within a few days. This, too, in cases where newly formed collateral lymph channels cannot be demonstrated. 3. That if the thoracic duct be ligated at a second operation shortly after the ligation of the common duct, the jaundice which appears after the first operation can be made to disappear. If, however, a period of six days intervenes before the second operation the jaundice persists.

Von Frey and Horley believe that the bile passes into the blood through rupture of the small bile capillaries into the perivascular lymph spaces. Heidenhain thinks that it is by filtration through the walls of the bile passages in the interlobular spaces. None of the observers explains the jaundice which occurs after ligature of the lymph channels.

Nauwerck says that this is explained by absorption within the cell by means of minute pre-formed intercellular canals. He bases his view on microscopical pictures seen in a case of hypertrophic cirrhosis.

The writer's observations are in confirmation of Nauwerck's view. His conclusions are that in the liver cell there are two systems for carrying away the secretions of that organ: 1, the bile system; 2, the glycogen system. They do not communicate. The latter begins as a fine basket-like network close about the nucleus, running in all directions throughout the cell, finally emptying into the blood capillaries. The bile system consists of larger vessels in communication with the so-called Kupffer's secreting vacuoles, and connecting with the intercellular bile capillaries. To demonstrate these he used various methods of hardening and staining. In case of a biliary obstruction there is pressure on the cells from the canals both within and without. This causes a degeneration of the cell and a deposit of pigment, which he describes in detail. The obstructed bile is then diffused throughout the cell and carried away into the blood by the unobstructed glycogen canals.

On the Histogenesis of Myomata of the Uterus.—COHEN (*Virchow's Archiv*, 1899, clviii., 524) concludes that in many cases of myoma of the uterus it is impossible to determine the origin. He distinguishes between the two following classes:

(*a*) Ordinary myomata in which occasional epithelial elements occur.

(*b*) The adenomyoma proper.

The scattered epithelial elements occurring in ordinary myomata he thinks may originate in a number of ways. Processes of the glands of the mucosa extending into the myometrium may be separated from their connection with the glands by the proliferating musculature. The myoma may develop in the region about a gland which has lost its connection with the endometrium during the intra-uterine period, and finally myomata develop in the region about a remnant of the Wolffian body.

The adenomyomata proper are those in which there is a proliferation of the epithelial elements as well as of the musculature. The adenomatous portion may originate from remains of the Wolffian body or from aberrant uterine glands displaced during embryonic or post-embryonic life. Histologically tumors of the two classes may be almost identical. He considers the following criteria the most valuable in differentiating between them: (*a*) The location (anterior or posterior wall, submucosa, intramural, susberous). (*b*) The connection of the glandular elements with the endometrium. (*c*) The simple, discrete structure of each adenomatous area when the condition is conspicuous in the whole tumor. (*d*) The presence of pigment.

It is conceivable, he says, that a leiomyoma may originate from the smooth muscles of any structure in the uterine wall. To determine the histogenesis he examined the whole of some of the smallest tumors by means of serial sections. In the central portion the muscle fibres were arranged concentrically in a ring around a small artery, so that usually no adventitia was seen, the media passing imperceptibly into the tissue of the tumor. That this relation was not secondary seemed to be indicated by the concentric arrangement and by the fact that in large tumors, where the relation to arteries was distinctly secondary, there was hyaline degeneration of the adventitia, and no direct connection between the media and the hyperplastic musculature of the tumor. In some of these small tumors, however, no histogenic relation to the arteries could be discovered.

In examining the whole of these tumors by serial sections no epithelial inclusions were found. This, he believes, demonstrates the fallacy of Ricker's hypothesis that all myomata of the uterus originate as adenomyomata.

In the normal uterus he is able to differentiate between aberrant glands originating in the endometrium and remains of the Wolffian body. The glands have the typical structure, are surrounded by "follicular" connective tissue, as in the mucosa, and they do not contain pigment. In the remnants of the Wolffian body, on the other hand, the connective tissue is spindle-celled, and in the epithelial cells and lumina of the glands may be demonstrated an iron-containing pigment.

In two of his cases, where the adenomatous elements seemed clearly to have originated from the mucous membrane, the structure was almost identical with that described by v. Recklinghausen as characteristic of the tumors

originating from remains of the Wolffian body. The pseudoglomeruli only were missing.

Cohen has made an important observation in regard to the pigment contained in the adenomyomata apparently originating from the Wolffian body. With few exceptions he finds that it always contains iron. The pigment in the normal remnants of the Wolffian body, especially the organ of Giraldis, in every case examined failed to respond to the tests for iron. He calls attention to the bearing of these facts upon v. Recklinghausen's suggestion of an homology between the pigments in these two situations.

[One might consider the fact that some adenomyomata, apparently originating from the mucosa of the uterus, have the structure described as characteristic of those arising from remnants of the Wolffian body, as evidence that the posterior part of the Müllerian duct originates in the anamnia by a division of the Wolffian duct. If this were the case it is conceivable that some of the tubules of the Wolffian body might be connected with that portion of the Wolffian duct which gives origin to the Müllerian duct. Retaining this connection as the Müllerian ducts fuse to form the uterus, they might give origin in adult life to an adenomyoma apparently taking its origin from the mucous membrane. At any rate, it is not remarkable that structures so closely associated in their origin should tend to approach each other in their adult form.—ED.]

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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The Use of Coloring Matters in Tracing Pollution of Water Supplies.—A comparative study of the efficiency of various coloring matters in tracing the flow of polluting influences has been made by A. TRILLAT (*Annales de l'Institut Pasteur*, 1899, v. p. 444), who was called upon to investigate a case in which he proved that a conduit was carrying other water than that for which it was intended. The coloring agents studied included eosin, auramin, acid fuchsin, safranin, methylene-blue, fluorescin, and others. Lime salts in water affect most of these by decolorizing them or throwing them out of solution. Those least affected are safranin, methylene-blue, and fluorescin. The intensity of the coloration of the several agents varies greatly, not only with the nature of the water, but still more with the nature of the soil. Clay and sand allow all the colors to pass freely; humus and garden soil will pass only acid fuchsin and fluorescin, while peat decolorizes all, even fluorescin. Dissolved in water in the proportion of one part in fifty millions the several

agents give different degrees of intensity of color in the following order: fluorescin, malachite-green, methylene-blue, violet, neutral fuchsin, safranin, congo-red. As fluorescin is more readily seen when very dilute solutions are examined against a black background, he devised a "fluoroscope" consisting of two tubes of white glass attached vertically to a stand by means of clamps. The tubes are 1.2 metres long, and 2 cm. in diameter. They are open at the top, and closed at the bottom with blackened stoppers. The depth of color is determined by looking downward at the black stopper through a column of water 1.2 metres in height, the other tube being filled with water containing no added substance. By means of this apparatus the ordinary visibility of fluorescin is increased to such an extent that one part can be seen when diluted with two billion parts of water. In many cases it is quite enough to add a small amount, say 100 grammes, of fluorescin to the water whose course is to be traced. A kilogramme suffices to impart color to the enormous bulk of 2,000,000 cubic metres.

Meat Poisoning.—In none of the numerous cases of meat poisoning hitherto investigated bacteriologically has the proteus vulgaris been definitely determined to be the exciting cause, although in several instances it has been under suspicion. The first case in which the evidence appears to be in any way conclusive is one reported by S. GLÜCKSMANN (*Centralblatt für Bäkteriologie*, XXV. p. 696). The offending meat was from a pig slaughtered on account of sickness. It was pickled for four days, and then smoked for three more and placed on sale. Those who ate the cooked meat suffered no inconvenience, but two persons, father and son, who ate a small piece in the raw state, were seized with gastro-enteritis, and the father died. Examination of the victim's organs yielded no satisfactory results. Proteus vulgaris was found in the meat and in the stomach contents. Bouillon cultures injected into mice and guinea-pigs proved to be very virulent. Glücksmann suggests that the bacillus may have been the cause of the sickness of the pig, or that the meat became contaminated by it after the slaughtering and during its treatment. In either case it is evident that neither pickling nor smoking was sufficient to interfere with the vitality of the organism.

Another outbreak of an unusual character in which no fatalities occurred is reported by DR. W. N. BARKER (*British Medical Journal*, November 11, 1899). Here the meat was canned corned-beef, which presented no unusual appearance other than that it was less firm than commonly is the case, and that the jelly was rather oily. It had no odor, and its taste was not disagreeable excepting to one of the twenty-four persons who shared it. All who ate were affected. Their ages ran from two to eighty-nine years, and about half were under twelve. The main symptoms were the same in all, but each case presented symptoms peculiar to itself. The following will serve as a type of the whole number: A woman ate about two ounces of the meat, and in two hours was seized with sudden faintness, dizziness, and drowsiness, followed by nausea and great muscular weakness, most marked in the legs. Vomiting and retching soon set in, accompanied by intense frontal headache, and followed by colic and diarrhœa. An hour after the onset she was removed to the hospital, where, when first seen, she was lying in a state of extreme collapse with her knees drawn up. The skin was cold and clammy,

the pulse small and rapid, respiration shallow, pupils dilated, and temperature subnormal. Her stomach was washed out, and this treatment was soon followed by improvement. The pulse became stronger, pain and retching ceased, drowsiness became less marked, and only the headache and diarrhœa remained. In about an hour the condition of collapse and other symptoms reappeared, but in less marked degree than before. The stomach was again washed out, and this time with permanent good effect. She slept well, and on the following morning all the symptoms, except slight frontal headache, had disappeared.

Bacteria in the Arctic Regions.—Some interesting facts concerning the freedom of the air, water, and even the intestinal contents of animals of Arctic regions from bacteria are communicated by DR. LEVIN, of Stockholm (*Annales de l'Institut Pasteur*, July, 1899, p. 558), who took part in the Natthorst expedition during the summer of 1898. Working each time with 20,000 litres of air, he found practically no bacteria. Sea water, snow, and ice yielded on an average one bacterium per 11 c.c. In twelve samples of brown mud he found only a single bacterium. The intestinal contents of polar bears, seals, eider ducks, and other birds, sharks, sea urchins, anemones, and crabs were nearly always sterile. Not only did he obtain no growths, but he was unable to find evidence of the presence of bacteria after staining the intestinal contents with the usual agents. These results confirm the conclusions of Nencki, Nuttall and Thierfelder concerning the presence of bacteria as a non-essential factor in digestion.

Toxalbumin in the Flesh of Eels.—The discovery by Mosso of a toxalbumin in the blood of certain eels led E. BENECH (*Comptes-rendus*, 1899, cxxviii. p. 833) to investigate the question whether such exists also in the flesh. The minced flesh completely freed from blood was extracted with cold water. The residue contained nothing poisonous, but the watery extract yielded a toxalbumin which in doses of 0.02 per kilogramme proved fatal to rabbits. The substance is very susceptible to heat. At 86° F. the solution became turbid; at 104° it loses its toxic quality, and at 131° it is precipitated.

Typhoid Bacilli in Drinking Water.—A positive result, said to be the first instance in which the isolated typhoid organism responded to every test, including growth on gelatin, potato, litmus milk, bouillon and glucose bouillon, agglutination, and Pfeiffer's test with animals, has been reported by DRS. KÜBLER and NEUFELD (*Zeitschrift für Hygiene und Infectionskrankheiten*, 1899, xxxi. p. 133). The contamination of the well, the water of which had caused a small local outbreak, was traced to the urine of a typhoid patient whose vessel was emptied near the well. That the contamination was not of fecal origin was evident from the absence of the colon bacillus. Four weeks from the time of the discovery of the organism a second examination was made. On this occasion bacilli were found which responded to all the tests except Pfeiffer's, which exception was attributed to modified virulence.

Typhoid Fever from Infected Vegetables.—The State Board of Health of Massachusetts has conducted an investigation of an outbreak of typhoid fever in a public institution, a hospital for the insane, at Northampton, Mass., and demonstrated that the disease was spread by celery raised on the premises. On September 10, 1899, after practical immunity for ten years, cases began to be reported, and in fifteen days thirty-nine cases occurred. It was discovered that while patients, nurses, and servants were attacked the non-paying patients were exempt. Both classes of patients received practically the same kind of food, but the paying patients had occasional allowances of extras, like fruit and certain vegetables, and at this time had been receiving celery raised in beds which were watered with filtered sewage. This had been given out not only to the paying patients, but to the nurses and farm hands as well. After the blame was placed and orders issued that no more of the celery should be used, one of the farm hands ate some, and within ten days came down with the disease. As soon as its use was discontinued the number of cases began to diminish.

Another outbreak of a similar character was reported by DR. FERRÉ (*Annales d'Hygiene Publique et de Médicine Legale*, January, 1899, p. 23) by whom it was investigated. This was in a girls' school at Jurancon (Basses-Pyrénees) which was attended by day scholars as well as by boarders. The drinking-water was exonerated, and the food supply inculpated by the fact that, while both classes used the water, only the boarders were seized. It was shown that the vegetable garden which supplied the school was watered with the contents of the cesspool which received the evacuations of all.

Transmission of Infection by Flies.—An interesting experiment illustrative of the possibility of transmission of infection through the agency of flies is communicated by DR. F. SMITH, of Sierra Leone (*Public Health*, December, 1898). Four Petri dishes were prepared, three with sterile, coagulated serum, and one with a culture of diphtheria on serum. A common house-fly was made to walk first over a sterile dish (No. 1), then over the one on which was the growth of diphtheria (No. 2), and next over the other two sterile ones (Nos. 3 and 4). Numbers 1, 3, and 4 were then placed in an incubator On the following day No. 1 showed only a few cocci, but Nos. 3 and 4 showed colonies of diphtheria bacilli in the tracks of the fly.

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